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THE SEVENTY-FIRST ANNUAL CONVENTION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION WILL BE HELD IN ASHEVILLE, N. C., DURING THE WEEK OF SEPTEMBER 3, 1923.

The 1923 meetings of the American Conference of Pharmaceutical Faculties and the National Association of Boards of Pharmacy will also be held in Asheville during the week of September 3.

For Association Roster see pages x, xii, xiv, and xv.

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HANBURY MEDALLIST, 1922
Honorary Member of American Pharmaceutical Association

ÉMILE PERROT

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. XII APRIL, 1923 No. 4

ÉMILE PERROT, D. ÉS. SC.

Émile Constant Perrot is a native of Marcilly-sur-Seine, France, where he was born in 1867. In preparing this brief account of our recently elected honorary member's scientific accomplishments and activities in pharmaceutical research liberty is taken in drawing freely on sketches that have appeared in the *Chemist and Druggist*, and *Pharmaceutical Journal and Pharmacist*.

Émile Perrot received his Bachelor degree at a provincial college at Sézanne and thereafter entered a pharmacy for his pupilage. After studying at the Paris School of Pharmacy, he worked in the hospitals as *interne* from 1890 to 1894. He took a bronze medal in the hospital examinations, a silver medal for micrography, the Menier prize, and a gold medal offered by the Paris Society of Pharmacy. His researches at that time related to the structure of cinnamon barks. In 1892 he was admitted to the laboratory of Prof. Leon Guignard (also an honorary member of the A. Ph. A.) as preparator, and during the next four years collaborated with Professor Radais. He graduated at the Sorbonne, first as Licencié and then as Docteur és. Sciences, his thesis for the latter being a research on the anatomy of the *Gentianaceae*. In 1899 he published a classical memoir on "Sieve Tissue," which gained for him the position of fellow in the Faculty of Pharmacy. In 1900 M. Gustave Planchon, director of the School, died and M. Perrot took up the duties of the former so far as the chair of materia medica was concerned, though he was not officially nominated professor until 1902.

The creation of the degree of Doctor for pharmacists attracted workers to the laboratories, and Prof. Perrot, assisted by his demonstrator and collaborator, M. Goris, was able to publish year by year, except during the War, an important volume, consisting of notes, researches, and theses, carried out by himself, his collaborators, and his pupils. Prof. Perrot's researches in materia medica have dealt chiefly with various species of *Cinnamomum* and of *Strychnos*, with the gentians, coriander fruits, Kinkeliba,* savin, ginseng, kola nuts, balsam of tolu, etc. In collaboration with M. Vogt, he published an important work on "Arrow and

* See Perrot and Lefevre, *Travaux du Laboratoire de Mat. Med.*, p. 67.

Ordeal Poisons;" with M. Gatin one on sapotaceous fats; with M. Eberhardt on the cinnamons of Indo-China. "The most important research of all is, however, without doubt that published by him in conjunction with M. Goris on the stabilization of vegetable drugs and the preparation of what have been termed 'physiological vegetable extracts' or 'intracts.' The process for these involves the destruction of all enzymes, and the drugs and galenical preparations thus produced possess the physiological action of the fresh plant and retain it indefinitely."

In execution of commissions by the French Government, Prof. Perrot has traveled over a considerable part of Africa, from the Congo to Gaboon, the Ivory Coast, Senegal, the Anglo-Egyptian Soudan, and Northern Africa. In 1900 he became secretary of the permanent committee for international botanical congresses. He is editor and one of the founders of the *Bulletin des Sciences Pharmacologiques*. He presided over the third section of the 1909 Pure Food Congress, and in 1910 was appointed a member of the permanent Codex revision committee. In 1896 he was made Officer d'Academie, in 1901 Chevalier of the Mérite Agricole, in 1903 Officer d'Instruction Publique, and in 1909 Chevalier of the Legion of Honor. When the United States joined in the Great War, M. Perrot coöperated in a Lorraine military laboratory of our Army.

Professor Perrot was awarded the Hanbury Medal last year; a print of the photograph taken during the presentation ceremonies is shown on page 4 of the January, 1923, JOURNAL A. PH. A.

E. G. E.

BUREAU OF THE CENSUS REPORTS RELATING TO THE DRUG INDUSTRIES.

The Department of Commerce announces that, according to reports made to the Bureau of the Census, the value of products of establishments engaged chiefly in grinding drugs amounted to $10,086,000 in 1921, as compared with $16,938,000 in 1919 and $8,080,000 in 1914, a decrease of 40 per cent. from 1919 to 1921, but an increase of 25 per cent. for the seven-year period 1914 to 1921. This industry includes establishments that grind drugs of all kinds, herbs, roots, gums, charcoal, etc. However, there are no statistics available in regard to the value of the drugs ground by the establishments classified under "patent medicines and compounds" and "druggists' preparations."

The value of products of the establishments engaged primarily in the manufacture of druggists' preparations, patent medicines and compounds, and perfumery and cosmetics amounted to $330,134,000 in 1921, as compared with $386,369,000 in 1919, and $167,372,000 in 1914. For each of the three industries the value of products reported for 1921 was as follows:

"Druggists' preparations" — $81,698,000, which was a decrease of 29 per cent. from 1919 to 1921, but an increase of 70 per cent. for the seven-year period 1914 to 1921;

"Patent medicines and compounds"—$175,895,000, which was a decrease of 17 per cent. from 1919 to 1921, but an increase of 72 per cent. for the seven year period 1914 to 1921;

"Perfumery and cosmetics"—$72,541,000, which was an increase of 22 per cent. from 1919 to 1921 and of 329 per cent. for the seven-year period 1914 to 1921."

In addition, establishments classified in other industries reported, as subsidiary products, druggists' preparations, patent medicines and compounds, and perfumery and cosmetics to the value of $12,039,000 in 1921; $31,852,000 in 1919; and $9,375,000 in 1914.

EDITORIAL

E. G. EBERLE, Editor 253 Bourse Bldg., PHILADELPHIA

THE NEXT STEP IN READJUSTING THE ACTIVITIES OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

AS the season approaches during which a majority of the state pharmaceutical associations hold their annual meetings attention should be directed in every possible way to the plan adopted by the American Pharmaceutical Association at its last annual meeting for readjusting its methods and procedure so as to make it more truly representative of and helpful to American Pharmacy as a whole, and to give the state associations a most responsible part in its control and direction.

A very important provision of the plan is that it is to become effective when at least twenty state associations, under the conditions specified, have approved it. It is hoped that *every* state association will approve the plan and vote affiliation with the American Pharmaceutical Association under its provisions before the next annual meeting is held at Asheville during the week of September 3rd so that the Association may then proceed with the enlarged activities contemplated.

The plan with explanatory matter was sent to the officers of each state association some time ago by the officers of the House of Delegates who were charged with the details of putting the plan into effect. Four state associations have now approved the plan either through their Executive Committees or at their annual meeting.

The active interest and coöperation of every A. Ph. A. member in each state is now needed to see that this most important measure is given careful and thorough consideration at the annual meeting of their association. Such consideration should lead to favorable action for certainly the state associations cannot afford to lose this most favorable opportunity to secure the big part in the direction and work of the American Pharmaceutical Association which they deserve and which this plan offers them.

E. F. KELLY,
Chairman, House of Delegates, A. Ph. A.

COÖPERATIVE SERVICE IN BEHALF OF THE PUBLIC BY COÖRDINATED ASSOCIATIONS OF THE DRUG INDUSTRIES.

THE question of readjustment of American Pharmaceutical Association activities for better and greater service of American pharmacy has been discussed from almost every angle. Few, if any, who have given thought to the subject

will question the need for a stronger active body-pharmaceutic organized for the purpose of discharging certain functions and duties which concern the associations of the drug industries, and officered so that the interests of all of them will be promoted.

There are two outstanding general themes that have prompted this comment, and these relate to the bringing about of a better understanding and relation between law making and enforcing authorities and officials and the governed industries of the drug trade, and also the development of a higher appreciation of the service and protection afforded the people by those engaged in pharmacy.

The very fact that hearings are accorded in Congress and legislatures testifies that a stronger influence would be more effective in enlightening legislators relative to measures concerning pharmacy and the drug business, and in the same way officials would be more readily persuaded to give closer attention to arguments of representatives than those of individuals, or of a larger representative organization than of a smaller one. A sympathetic ear sometimes destroys good legislation, and political influence occasionally secures office for individuals who place their own interests above those they should subserve; as results, we have numerous ineffective laws, some impractical and unreasonable regulations, and occasionally an official who misinterprets his duties.

R. H. Tawney in "The Acquisitive Society" states that "a profession may be defined most simply as a trade which is organized, incompletely, no doubt, but genuinely for the performance of function. It is not simply a collection of individuals who get a living for themselves by the same kind of work. Nor is it merely a group which is organized exclusively for the economic protection of its members, though that is normally among its purposes. It is a body of men who carry on their work in accordance with rules designed to enforce certain standards both for the better protection of its members and for the better service of the public. The standards which it maintains may be high or low; all professions have some rules which protect the interests of the community and others which are an imposition on it. Its essence is that it assumes certain responsibilities for the competence of its members or the quality of its wares, and that it deliberately prohibits certain kinds of conduct on the ground that, though they may be profitable to the individual, they are calculated to bring into disrepute the organization to which he belongs."

In the proposed organization the relation of one branch of the drug industries to another will more definitely develop and a fuller realization of the possibilities of each will contribute to their greater usefulness; for after all, the largeness of their relationship determines their value. Other viewpoints are that the public should be educated to insist on a safe and qualified pharmaceutical service, and withhold their patronage from those in the drug business mainly because of mercenary motives, and there should be an insistence on the part of the organizations, as far as is within their power, to keep the unfit out of pharmacy—those who cannot or will not comprehend its responsibilities to the public—thereby law-enforcement is made more effective.

E. G. E.

IDEALS IN PHARMACY VS. NARCOTIC MENACE.

THE code of ethics of the American Pharmaceutical Association admonishes the pharmacist—"to always be ready to coöperate with the proper authorities having charge of the enforcement of the laws;" that he "should be willing to join any constructive effort to promote the public welfare and he should regulate his public and private conduct and deeds so as to entitle him to the respect and confidence of the community in which he practices."

The address of President Clair A. Dye, of the American Conference of Pharmaceutical Faculties, is published in the Proceedings of the A. C. P. F.,* just received, and is well worth reading and studying; for the purpose of this writing part of the closing paragraphs relating to "Ideals in Pharmacy," follow:

> The position any business or any profession occupies in the mind of the public is governed by the educational, professional, business and ethical ideals of the individuals engaged in the business or profession. This position is to be especially guarded in the handling and dispensing of narcotics and alcoholic prescriptions and our business ethics. We should point out to our students the fact that, while a part of a pharmacist's duties are commercial, there are professional duties as well, and that in performing these there are certain ethical standards and ideals to be observed. As a background or foundation upon which to build these ideals we must have an educational training sufficient to enable the student to appreciate the importance of the work he has chosen and comprehend the relationship he bears to society. There is every reason to expect that the student will respond to such a program of ideals and interests and will grow away from many of the petty prejudices and provincialisms which surround pharmacy to-day. In so doing they will develop a keener appreciation of the importance and responsibilities of the pharmacist to the community as well as to his fellow-workers.

The attitude of pharmacists, members of the associations mentioned and of sister organizations and state associations is indicated by the foregoing. The Conference heartily endorsed President Dye's recommendations in this particular and the address in general.

This comment is to emphasize the principles which govern the great majority of pharmacists, mindful of the greatest charity—that which attributes honest motives to others. The public has not come to a full realization of its part in the narcotic menace because of the encouragement given others than pharmacists as vendors of medicinals. While in some instances such sales may be a convenience the opportunities for law violations are extended. This is deserving of most serious consideration, even though the large illegitimate distribution of narcotics is entirely outside of the drug trade—all avenues should be guarded.

Character endorsements for entrants to schools of pharmacy, graduation prerequisite in all states, lawful possession of narcotics permitted only to those registered under the law, and further scientific study of narcotic drug addiction in its several phases will assist materially in making narcotic control possible—the public will be helped by education along these lines.

E. G. E.

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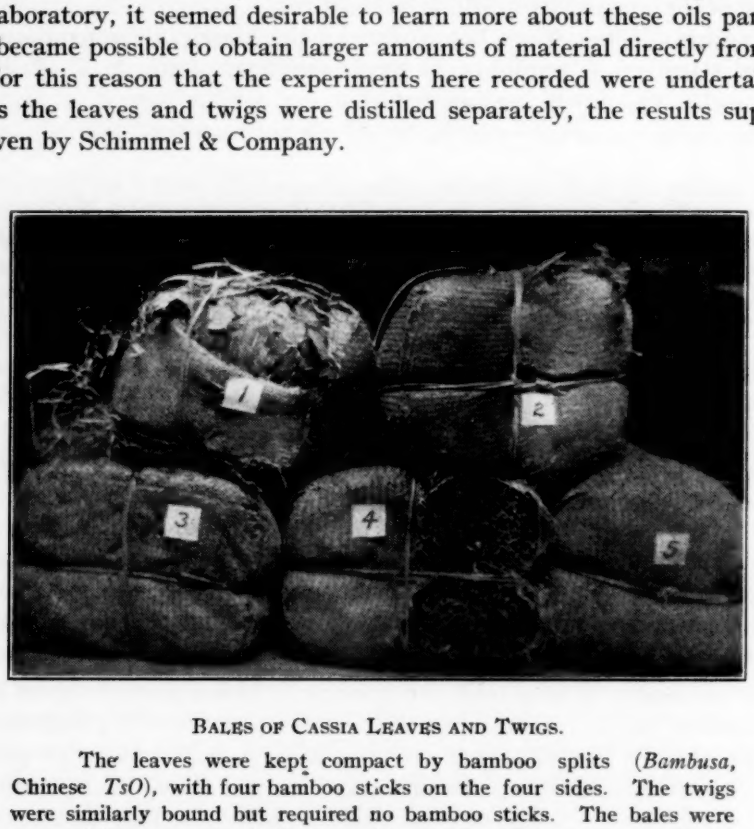
* Also published in JOURNAL A. PH. A., September 1922, pp. 130–140.

PHYTOCHEMICAL NOTES.*

No. 91 Cassia Oils from Leaves and Twigs.[1]

BY K. K. CHEN.

Ever since Schimmel & Company in 1892[2] distilled the several parts of *Cinnamomum Cassia* Blume, the cassia oil situation has beeen pretty well understood. In connection with the study of Chinese medicinal plants and drugs undertaken in this laboratory, it seemed desirable to learn more about these oils particularly since it became possible to obtain larger amounts of material directly from China. It was for this reason that the experiments here recorded were undertaken. In so far as the leaves and twigs were distilled separately, the results supplement those given by Schimmel & Company.



BALES OF CASSIA LEAVES AND TWIGS.

The leaves were kept compact by bamboo splits (*Bambusa*, Chinese *TsO*), with four bamboo sticks on the four sides. The twigs were similarly bound but required no bamboo sticks. The bales were wrapped in mats made of *Livistoma chinensis* Br. (Chinese, *Boo Pao*) and tied with rattan, a species of *Calamus* (Chinese *Dun*).

Source and Description of Material.—Upon the suggestion of Dr. Paul Reinsch, late Ambassador of the United States of America to China, the materials used in this investigation were kindly imported from China by Anderson, Meyer & Co. of New York City. They consisted of five bales of about 100 pounds each: three of leaves and two of twigs, which are shown in the accompanying photograph.

The weights of the individual bales, of their contents, etc., are herewith tabulated.

---

* From the Laboratory of Edward Kremers.

[1] Scientific Section, A. Ph. A., Cleveland meeting, 1922.

[2] Bericht von Schimmel & Co., Oct. 1892, p. 12.

Bale No.	Material.	Gross wt., lbs.	Wt. of packing, etc., lbs.	Sample taken out, lbs.	Net wt. for experiment, lbs.
1	Leaves	99	8 1/2	2	88 1/2
2	Leaves	102 1/2	8 1/2	..	94
3	Twigs	95	5 1/2	2	87 1/2
4	Twigs	95 1/2	5 1/2	3	87
5	Leaves	104	8 1/2	..	95 1/2

Distillation of the Oil.—The large still being out of commission, the 60-liter Lentz distilling apparatus had to be used. The leaves being hard they could not be packed well, hence those for the first charge (27 pounds) were cut. The second charge of uncut leaves was 22.7 pounds. Inasmuch as no particular advantage was gained by cutting, this operation was dispensed with. The distillation of a full charge of leaves required two hours and forty minutes, the oil being collected in Florence flasks. The milky aqueous distillate cleared in a day or two with the separation of oily drops. It was cohobated repeatedly, more oil resulting from cohobation than from the original distillation. The volumes that had to be dealt with are herewith tabulated:

	Bale No. 1 of 98 1/2 lbs., gals.	Bale No. 5 of 89 1/4 lbs., gals.	Bale No. 2 of 100 1/4 lbs., gals.
Original distillate.....	50	31	40
After 1st cohobation....	18 1/2	14	15
After 2nd cohobation....	8 2/3	6	7 1/2
After 3rd cohobation....	5	4	5
After 4th cohobation....		5[1]	
After 5th cohobation....		3	
After 6th cohobation....		2	
After 7th cohobation....		1 1/3	

The amounts of oil that were separated from the aqueous condensate after each distillation are herewith tabulated:

Original distillate.....	..[2]	32.7 Gm. = 0.08 p. c.	52.5 Gm. = 0.12 p. c.
After 1st cohobation....			
After 2nd cohobation....		138.8 Gm. = 0.34 p. c.	177.7 Gm. = 0.39 p. c.
After 3rd cohobation....			
After 4th cohobation....			
After 5th cohobation....			
After 6th cohobation....		110.6[1] Gm.	
After 7th cohobation....			

[1] From the fourth cohobation on, the aqueous cohobates, also the oily distillates, were mixed for the three bales, hence no separate record for each bale.

[2] Of bale No. 1 the original oil and cohobates Nos. 1, 2 and 3 were not kept separate. The mixed oils amounted to 146.4 grams = 0.30 p. c.

The total of 288 lbs. of leaves yielded a total of 658.7 grams of oil or 0.52 p. c.

The twigs were cut into lengths of 3 to 4 cm., 54 lbs. constituting a charge, the distillation of which required six and one-half hours. The first charge was distilled with dry steam. The second charge was soaked with water for about twenty-one hours previous to distillation. The former yielded more oil with the original distillate and less from the first three cohobations than the latter. Of about 20 l. of water added to the second charge only 8 l. were recovered as extract after the distillation. Inasmuch as nothing was gained by the soaking, the remaining charges were distilled dry. Both aqueous and oily distillates are again tabulated.

TABLE OF AQUEOUS AND OILY DISTILLATES OF TWIGS (BALES 3 AND 4 = 174½ LBS.).

	Water, gals.	Wt. of oil, Gm.
Original distillate	64½	275.2 = 0.34 p. c.
After 1st cohobation	26½	
After 2nd cohobation	12½	384.9 = 0.52 p. c.
After 3rd cohobation	6½	
After 4th cohobation	2½	
After 5th cohobation	1½	55.7
After 6th cohobation	1½	
Total		715.8 = 0.90 + p. c.

Whereas 288 lbs. of leaves yielded a total of 658 Gm. or 0.52 p. c. of oil, 174½ lbs. of twigs yielded 715.8 Gm. of oil or 0.90 + p. c.

The densities of the leaf oils determined at 22° are herewith tabulated for comparison.

	Original oil.	Oil from Cohobations 1, 2 and 3.	Oil from Cohobations, 4, 5, 6, and 7.
Bale No. 1	....	1.0547	
		1.0530	
Bale No. 5	1.0525	1.0540	1.0514
Bale No. 2	1.0523	1.0535	
The corresponding data for the twig oils:			
Charge No. 1	1.0400	1.0477	
Charge No. 2	1.0420	1.0477	1.0473
Charge No. 3	1.0393	1.0465	
Charge No. 4	....	....	

Schimmel & Co.[1] record that the leaves (incl. stalks) and young twigs yielded 0.77 p. c. of an oil the specific gravity of which (apparently at 15°) was 1.055. (Aldehyde content 93 p. c.)

According to the results here recorded, the leaves yielded a total oil of 0.52 p. c. with a density of about 1.054 at 22°, whereas the twigs yielded a total of 0.90 p. c. of oil with a density of about 1.047. It will be seen that the twigs yielded a somewhat larger amount of oil with a slightly lower density than the leaves. The ratio in which leaves and twigs occur on the Cassia shrub does not seem to have been recorded.

CONTRIBUTIONS TO THE KNOWLEDGE OF FOREST PRODUCTS.

V. ON NITRO-2, AND AMINO-2 CYMENE.*

BY W. A. DEMONBREUN AND R. E. KREMERS.

As has been emphasized in the preceding article, the study of cymene and its derivatives forms a unit in the scheme for the development of a more comprehensive policy of forest utilization. This and the succeeding paper are therefore continuations of the effort to shed more light on the chemistry of cymene.

One way of attacking the general problem involved in these researches is to reason by analogy. The idea is not new that cymene can be nitrated, the nitro-compound reduced to an amino-compound, and the latter in turn involved in

* Based on part of a thesis presented by W. A. D. to the Graduate Faculty of Vanderbilt University in partial fulfilment of the requirements for the Degree of Master of Science, June 1922.

characteristic reactions, just as in the case of benzene. It has already led to many experiments.[1] It is only recently, however, that amino-2 cymene has been readily available for synthetic purposes.[2] One of the many possibilities suggested by the behavior of aniline, but so far not studied, is the preparation of cymylhydrazine. This very reactive compound would in its turn lead to many other substances. It was with the object of preparing this hydrazine derivative that the experiments here recorded were made. The writers feel that their experiences in learning how to produce amino-2 cymene in sufficient quantity for synthetic purposes may be of some service to others. We began by following the directions of Andrews.

Purification of p-Cymene.—Technical cymene procured from the Eastman Kodak Co. was purified by shaking with concentrated sulphuric acid until fresh acid scarcely darkened in contact with the hydrocarbon. The latter was then given a final washing with water, dried over anhydrous sodium sulphate, and distilled through a column. From 907 grams there were obtained 805 grams of cymene which had the following constants:

B. $p._{759}$ = 173–4° C.; d_{20} = 0.8540; n_{20} = 1.4872; α = ± 0.00°.

This material was used in part of the nitrations. By this process of purification some sulphonation occurs, as cymene sulphonic acid was later separated in crystalline form from the acid residues.

Run.	H_2SO_4.[1]	HNO_3.	Gas.	Crystal.	Temp.	Cymene,[2] Gm.	Nitro,[3] Gm.	P. c. yield.
1	1.82	1.42	+	−	−5 to 0°	25.0	..	..
2	1.82	1.42	+	−	−5 to 0°	35.5	10.0	19.1[4]
3	1.84	1.42	+	−	−5 to 0°	67.0	25.0	27.7
4	1.90	1.42	+	−	−5 to 0°	67.0	8.0	8.8
5	1.84	1.42	+	−	0 to 10°	67.0	..	..[5]
6	1.84	1.42	+	+	−5 to 0°	67.0	26.0	28.5
7	1.84	1.42	+	+	−5 to 0°	67.0	28.0	31.0
8	1.82	1.42	+	−	−5 to 0°	67.0	15.0	19.0
9	1.82	1.42	+	−	0 to 5°	67.0	22.0	24.4
10	1.82	1.42	+	−	−5 to 0°	67.0	27.5	30.3[6]
11	1.82	1.42	+	−	0 to 5°	67.0	30.5	34.0
12	1.84	1.42	−	+	−5 to 0°	67.0	35.0	37.5
13	1.84	1.42	−	−	0 to 5°	67.0	38.0	41.5
14	1.83	1.42	−	+	−5 to 0°	67.0	45.5	50.5
15	1.83	1.42	−	−	0 to 5°	67.0	47.5	52.5
16	1.83	1.42	−	−	0 to 3°	67.0	54.5	60.4
17	1.83	1.42	−	−	0 to 3°	67.0	58.7	65.2

[1] Densities were determined by a Mohr-Westphal balance at room temperature, approximately 23° C.

[2] Purified cymene was used in runs 1–9, incl., and in 11–15 incl. Technical cymene was used in all other nitrations.

[3] The weight of nitrocymene given corresponds to that of the steam distilled oil heavier than water.

[4] 0.5 gram of urea was added to No. 2.

[5] The mixed acids were added from an ice packed burette.

[6] An electric stirrer was used in Runs 10–17, incl.

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[1] See preceding for bibliography of various lines of endeavor, p. 224, March JOUR. A. PH. A.

[2] Andrews, *Jour. Ind. Eng. Chem.*, 10, 453, 1918.

Nitration of p-Cymene.—In the first attempt at nitration Andrews' directions were followed as literally as possible. The reaction ended with a copious evolution of oxides of nitrogen, a flat failure. According to our information, others have had a similar experience. In the belief that the adjustment of some factor or factors was not quite accurately reproduceable from the original directions, we modified conditions slightly in various ways. The concentrations of the acids, the temperature, the efficiency of the agitation, were all varied; technical cymene was used in place of highly purified, and urea was added in one instance in hope of arresting the oxidative effect of nitrous oxide. A tabulation of the results is given in the preceding table.

The final working conditions which gave the best results, Run 17, were as follows:

Sixty-seven grams of sulphuric acid (d = 1.83) was introduced into a heavy porcelain beaker that had been packed in ice. An electrically driven stirrer was started in the acid and 67 grams of cymene were gradually added. When the temperature of the mixture had fallen to 0° C., a well cooled solution of 50 Gm. nitric acid (d = 1.42) and 105 Gm. sulphuric acid (d = 1.83) was added drop by drop from a burette at such a rate that the nitration temperature ranged between 0 and +3° C. At the same time a little salt was added to the ice to produce more efficient cooling. The addition of the mixed acid required about 6 hours. The reaction proceeded very smoothly under these conditions; towards the end the product became reddish brown in color and quite viscous. Stirring was continued 30 minutes after the last of the nitrating acids had been added.

The reaction product was then poured into an equal volume of cold water. The supernatant oil was separated by a funnel and twice washed with water. It was next fractionated by steam distillation into a fraction lighter than water (7 Gm.) and a fraction heavier than water (58.7 Gm.). The former was light yellow in color, the latter was darker and more strongly aromatic.

The crude nitrocymene was dried over anhydrous calcium chloride and was finally purified in larger quantities by distillation *in vacuo*. The constants of the pure product were:

$$\text{B. } p_{\cdot 14} = 130\text{–}35^\circ \text{ C.}; \; d_{23} = 1.0355; \; n_{23} = 1.5290.$$

In a summary of our experiences it may be said:

1. That difficulty was encountered in trying to follow Andrews' directions, but that with suitable minor modifications they have proven satisfactory.

2. That sulphuric acid of a density 1.83 and a temperature range of 0 to +3°C. are more favorable than the conditions originally specified.

3. That we have confirmed the statement of Wheeler and Smithey regarding the necessity of very efficient agitation.[1]

4. That so far it has not been possible for us to attain an 85 per cent. yield of actual nitrocymene.

5. That contrary to Andrews' statement, it was desirable to purify the steam distilled nitrocymene by a further fractionation *in vacuo*. The resultant product not only kept better, but also gave better results on reduction.

[1] *Jour. Am. Chem. Soc.*, 43, 2611, 1921. This part of our research had been practically completed before their paper appeared.

6. That "technical" cymene appeared to give less trouble during nitration in the way of temperature control and gas formation than a carefully purified hydrocarbon.

The "Nitration Crystals."—During the nitration of p-cymene it is not an uncommon occurrence that colorless crystals separate in some quantity. Wheeler and Smithey ventured the opinion that they were composed of nitrocymene frozen out because of the low temperature. They furthermore state that they added acetic acid in order to prevent their separation. Our experiences, particularly our observation that crystal formation in quantity augured for a poor yield, led us to doubt this statement. Since we had already prepared sufficient nitrocymene for subsequent use, we contented ourselves with a few confirmatory observations.

In the first place our pure nitrocymene could not be induced by any means to crystallize at —12° C., a lower temperature than any reached in the course of our nitrations. Secondly we prepared a quantity of crystals with a view to attempted isolation. For this purpose 15 Gm. of purified cymene were nitrated with the usual proportions of acids; the sulphuric acid employed had a density of 1.84 and the temperature of reaction was from —8 to —5° C. After three fourths of the nitrating acids had been added, a mass of crystals, apparently mono-clinic, separated. They were quickly separated by decantation and suction filtration; although readily obtainable in this way, they did not appear to be very stable and gradually shrunk and disappeared as they had a chance to warm up. When water at ordinary temperature was added to some crystals, they melted immediately with a slight evolution of nitrous oxide, but not enough to indicate that they were nitrosyl-sulphuric acid (chamber crystals). When ice water was added they did not melt at once, suggesting that they were not hydrated sulphuric acid. When the crystals were treated with enough water to dilute the solution, an oil separated, but the oil was only a fraction of the mass of the crystals. The oil was nitrocymene as proved by its odor, reduction to amino-cymene and the conversion of the latter into its hydrochloride. It therefore appears that the crystals are not nitrocymene. On the other hand our meager tests do not offer any positive suggestions. All in all, we are inclined to think that the crystals represent either an intermediate or an incidental product of nitration, and we feel that a better knowledge of them would contribute to an understanding of the process of nitration. We shall study this question as opportunity offers.

Preparation of Amino-2 Cymene.—The nitrocymene prepared as just described was then reduced to the corresponding amine. Two of the usual methods were employed. In the first, tin was the reducing agent. Forty-five grams of tin and 25 grams of nitrocymene were placed in a round bottom liter-flask fitted with an "adapter," which carried a dropping funnel and a reflux condenser. The mixture was heated to 90° on a water-bath and 85 cc of concentrated hydrochloric acid was then added at such a rate that the mixture boiled gently without further heating. The flask was shaken constantly. The reduction was finally completed by heating the mixture on the water-bath for an hour. The base was separated by steam distillation from the product made strongly alkaline with sodium hydroxide. The yield varied between 10 and 15 grams, the latter being 75 p. c. of the theoretical.

Profiting by our experiences in nitration, we decided to try mechanical agitation and abandoned this procedure after three runs in favor of iron powder which

we thought could be more easily stirred than granulated tin. Sixty grams of iron powder and 80 cc of hot water were introduced into a liter round bottom flask and the mouth closed with a two holed rubber stopper. Through one hole had been inserted a stirring rod and shaft, the other carried an "adapter" with dropping funnel and reflux condenser. After starting the electrically driven stirrer, a few drops of nitrocymene were introduced, then 5 cc of concentrated hydrochloric acid, and after that in all 50 grams of nitrocymene. The latter was added in the course of an hour at such a rate that the temperature remained at about 90° C. Toward the end of the reaction it was necessary to add 4 cc more of acid and to raise the temperature to about 100° C. The stirring and the heating were continued a half hour after the addition of the nitrocymene ended. The flask was then allowed to cool, its contents were made strongly alkaline with caustic soda, and the base was separated by steam distillation. The aminocymene was recovered from the aqueous distillate partly by mechanical separation and partly by ether extraction. The oil was dried over anhydrous sodium sulphate prior to purification.

This process worked so well that it was used for the production of the necessary amounts of aminocymene. The quantities for a run were increased in proportion to 75 grams of nitrocymene. The best result was a yield of 62 grams of crude base, corresponding to 99 p. c. of the theoretical.

The amino cymene was purified by fractionating *in vacuo*. In one instance 150 grams of oil were resolved into the following fractions:

Fraction.	B. p. 13 mm.	Weight, Gm.
1	80–100° C.	5
2	100–119°	35
3	119–124°	100
4	124–	10 approx.

Fraction 1 appeared to be cymene. Fraction 2 was mainly amino cymene as was proved by its conversion into the hydrochloride and removal of non-basic material by steam distillation. Fraction 3 was pure amino-2 cymene, having the constants:

$$d_{23} = 0.9448; \quad n_{23} = 1.5395.$$

The following values have been previously recorded for the compound:

$$\text{B. p.} = 118\text{–}21° \text{ C.}; \quad d_{20} = 0.9442; \quad n_{20} = 1.5387.$$

Amino-2 cymene was further identified by conversion into two derivatives. The hydrochloride melted at 206–7° C., and the acetyl derivative at 70–1° C. Both compounds were purified by recrystallization from 5 p. c. alcohol.

To summarize, it was found that efficient stirring was helpful in the reduction of nitrocymene to aminocymene, and that iron powder as reducing agent gave excellent yields. It was also found necessary to purify the crude base by distillation *in vacuo*, both because the product kept better, and because the success of subsequent reactions depended upon the purity of the base.

OCCURRENCE AND FORMS OF CALCIUM OXALATE CRYSTALS IN OFFICIAL CRUDE DRUGS.*

BY EDGAR T. WHERRY AND GEORGE L. KEENAN, BUREAU OF CHEMISTRY.

INTRODUCTION.

About 75 of the crude drugs listed in the U. S. Pharmacopœia, 9th revision and the National Formulary, 4th edition, are stated to contain crystals of calcium oxalate. These are described in a general way as individual crystals, either prisms or pyramids, as needles or raphides, as sphenoidal micro-crystals, as rosette groups, etc. While there was no reason to doubt the correctness of the identification of the substance as calcium oxalate in the majority of cases, Dr. Carl L. Alsberg, while Chief of the Bureau of Chemistry, suggested to the authors the desirability of making a study of these crystals by the immersion method under the petrographic microscope. This method has been introduced into work of this sort only recently (after the publication of the last editions of the Pharmacopœia and National Formulary), but it has already proved of great value in the identification of crystalline chemical substances.

The idea in this study was to ascertain whether the crystals actually possessed the optical properties of ordinary calcium oxalate (which is the monohydrate, $CaC_2O_4 . H_2O$) in every case; to endeavor to identify any which should prove to have different properties; and to work out the crystallographic orientation of each type of calcium oxalate crystal represented. The technical crystallographic-optical data have been reviewed elsewhere.[1]

CALCIUM OXALATE MONOHYDRATE.

A specimen of each crude drug was reduced to powder, and a minute quantity was placed on a microscope slide. This was moistened with a tiny drop of an oily liquid having the refractive index 1.650, attention being given to the distribution of the material in the liquid, and the cover glass was then applied. The liquid used consisted of monobromnaphthalene to which a very little monochlornaphthalene had been added. The slide was then examined under a microscope provided with a revolving stage, nicol prisms, cross-hairs in the eyepiece parallel to the vibration-planes of these nicols, and a substage diaphragm. Crystals were located in the mass by search with the nicols crossed, so that the bulk of the field was dark. Fragments of vegetable matter and starch grains, if present, produced their characteristic polarization effects, but any crystals of calcium oxalate could be readily picked out by their polarization colors, which consist of faint greenish or pinkish tints. When a good distinct crystal of this material was found, it was centered in the field, and turned to extinction position, that is, until it became dark; the upper nicol prism (analyzer) was withdrawn and the substage diaphragm was partly closed. In some cases the crystal would then be invisible, showing that its refractive index, in the crystallographic direction which happened to lie parallel to the vibration-plane of the polarizing nicol prism, was identical with the refractive index of the immersion liquid. As this liquid was chosen to correspond to index gamma (γ) of calcium oxalate monohydrate (the highest of the three refractive indices), this result showed that the crystal was lying with the direction

* Scientific Section, A. Ph. A., Cleveland meeting, 1922.

[1] Edgar T. Wherry, *J. Wash. Acad. Sci.*, 12, 196–200, 1922.

yielding index γ parallel to the surface of the slide, and likewise parallel to the cross-hair in the eyepiece which had been found by trial to correspond to the vibration plane of the polarizing nicol. By then observing the shape of the crystal, it was possible to make out something as to its crystallographic orientation.

In case the crystal was still visible when the analyzing nicol was withdrawn and the diaphragm narrowed, the stage was rotated 90° and the crystal again observed. In some cases it would disappear in this position, again giving the location of γ; but in other cases it would remain clearly visible in all positions, and, on raising the tube of the microscope slightly, a band of light would be seen to spread out from the crystal into the liquid. This showed that the crystal chosen happened to lie in such a position that the direction of index γ was not parallel to the slide, but the directions of the other, lower, indices were so situated instead. A number of other crystals in the same slide would then be examined in like manner.

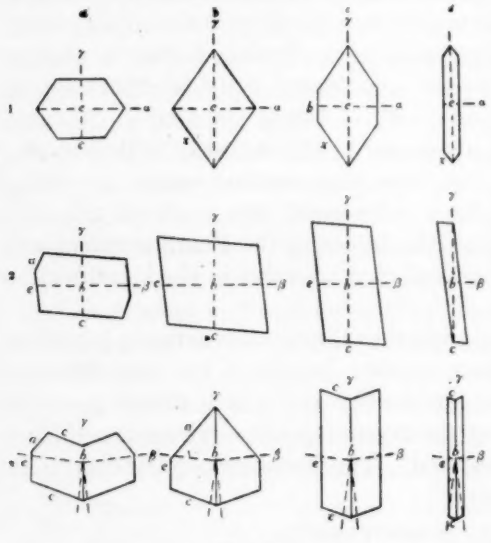

Fig. 1.

The crystals in rows 1 and 2 are represented in extinction positions with reference to the nicol prisms, the vibration planes of which are indicated by the dash lines. The positions of the directions in which the refractive indices α, β and γ are shown are indicated by the appropriate characters above and to the right in each case. The crystal forms represented are shown by letters, the names of these being: *a*, ortho or front pinacoid (100); *b*, clino or side pinacoid (010); *c*, base (001); *e*, negative unit orthodome ($10\bar{1}$); and *x*, unit clino or side dome (011). There is no evidence that form *a* actually occurs on any of the crystals, but they are sometimes bounded in part by edges between other faces occupying the same position as *a*.

The crystals in row 3 are twins, that is, are made up of parts of two crystals, one revolved 180° around an axis perpendicular to a given plane, with respect to the other. These are represented in the position half way between the extinction positions on either side. The directions of indices β and γ are shown by the dash lines. The forms are the same as in the other diagrams, the twinning plane being *e* ($10\bar{1}$).

Having thus established the presence or absence of crystals showing the index γ of calcium oxalate, and having obtained some data as to the shape of the crystal with reference to the direction in which index γ was shown, the process was repeated with immersion liquids made up to match the other two refractive indices of calcium oxalate, alpha (α) = 1.490 and beta (β) = 1.555. The first liquid consisted of a liquid petrolatum made from California petroleum and sold for medicinal purposes; the second liquid was a mixture of about 6 parts of this petrolatum with 4 parts of monochlornaphthalene. Nitrobenzene could also have been used for matching index β, as its refractive index, 1.553, is near enough for practical purposes. When crystals disappeared in either of these liquids, it was possible to make observations as to the shape of the crystal and the orientation of the directions in which these refractive indices were shown.

The series of photomicrographs in Figure 2 show the general features observed. These photomicrographs were made on slides prepared and used for the observations

outlined, and with nicol prisms crossed. Figure 1 shows a series of diagrams arranged to correspond with the photomicrographs, and with letters showing the crystallographic orientation and refractive index directions added. Angles slightly different from those here indicated will be shown if the crystals are tilted in other directions than those selected for illustration, so that no significance should be attached to lack of exact agreement in angles between unknown crystals and these shown here. It must also be remembered that the breaking up of crystals with rhombic outline may yield triangular fragments.

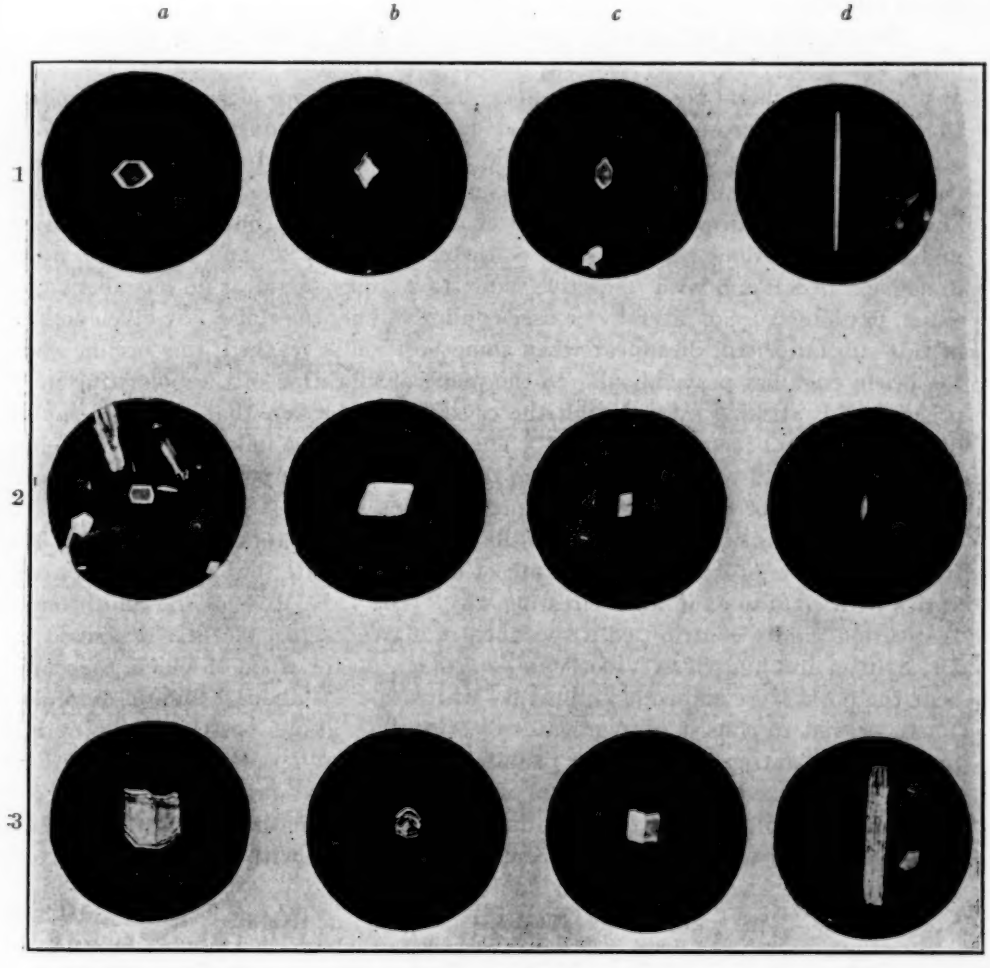

Fig. 2.

1*a*, Prunus (×175)
2*a*, Quassia (×175)
3*a*, Quassia (×175)
1*b*, Prunus (×175)
2*b*, Eucalyptus (×360)
3*b*, Quassia (×175)
1*c*, Eucalyptus (×360)
2*c*, Scammony (×175)
3*c*, Rhamnus (× 175)
1*d*, Veratrum (×190)
2*d*, Cinnamomum (×175)
3*d*, Scilla (×60)

With the aid of these figures, supplemented by actual measurement, using the method outlined, of refractive index γ, and if possible one or both of the others,

the identification of very minute grains as calcium oxalate monohydrate may be readily accomplished.[1]

OTHER OXALATES.

Tetragonal Calcium Oxalate.—A form of calcium oxalate crystallizing in the tetragonal system has been recorded as occurring in several plants, especially in the vari-colored spiderwort, *Tradescantia* (*Rhoeo*) *discolor*, in the skin of the common onion (*Allium cepa*), and in several species of cacti, including the official cactus. The authors found it also in hyoscyamus. Its crystallographic-optical properties are as follows:

The crystals are tetragonal prisms, terminated by pyramids, the usual outline being hexagonal; they may also be broken into irregular fragments. They are optically uniaxial and positive. Fresh crystals in tiny drops of sap from the spiderwort, dried on microscope slides and at once matched against immersion liquids of various refractive indices, showed omega (ω) = 1.490 and epsilon (ϵ) = 1.540. On exposure to the air, however, the crystals increase in refractive indices, without obvious loss of transparency or other change, the values obtained on air-dried material from various sources being consistently ω = 1.520 and ϵ = 1.545. On immersion in a liquid with refractive index 1.52 (some sassafras oil has about this value, but a mixture of oils may be used) and revolving the stage, any given crystal of this substance will disappear when some position is reached; this occurs when the prism edge lies perpendicular to the plane of vibration of the polarizing nicol prism, but is striking even though the crystal is so broken that crystallographic directions are not recognizable in it. The other refractive index may be matched so that the crystal will disappear when turned to a certain position, by immersion in benzaldehyde or a mixture with refractive index 1.545.

As to composition, it has been possible to confirm the work of Schmid[2] that the fresh material is probably a trihydrate of calcium oxalate; but the water content varies with conditions in an interesting way. Dr. J. N. Rose of the Smithsonian Institution kindly contributed a specimen of a tree cactus, recently described by Dr. Britton and himself as *Neoabbotia paniculata*,[3] in the wood of which, especially near the bark, were embedded numerous whitish pellets about 1 mm. in diameter. These proved to consist of aggregates of crystalline grains possessing the optical properties of tetragonal calcium oxalate. Accordingly, several grams of these grains were picked out as free from vegetable tissue as practicable, although a little material still adhered to them, and were analyzed in duplicate by J. H. Ellis of the Bureau of Chemistry. The results are compared with the theoretical compositions of the several hydrates in Table 1.

TABLE 1.—Compositions of Calcium Oxalate Hydrates.

	Found.	3 H_2O.	2½ H_2O.	2 H_2O.	1 H_2O.	Anhydr.
CaO.....	33.53	30.79	32.39	34.17	38.38	43.78
C.....	13.22	13.18	13.86	14.62	16.43	18.74
O.....	[29.30]	26.36	27.73	29.25	32.86	37.48
H_2O.....	23.95	29.67	26.02	21.96	12.33	...
	100.00	100.00	100.00	100.00	100.00	100.00

[1] For a bibliography of previous work on the recognition of calcium oxalate, its occurrence in plants in general, etc., see N. Patschovsky, *Beih. Bot. Centralbl.*, 37, 261–380, 1920.

[2] E. E. Schmid, *Ann. Chem.*, 97, 225–241, 1856.

[3] N. L. Britton and J. N. Rose, *Smithsonian Misc. Coll.*, 72 (No. 9), 6 pp. (1921).

On heating the air-dried material, which was optically homogeneous, to 105–110° C. for a few hours, it lost about 4% of water, and microscopic examination of the powder showed well-defined crystals of the monohydrate beginning to appear, in the midst of unchanged tetragonal grains. After heating to 150° C., however, the loss of water amounted to 20.5% and practically all the tetragonal material had disappeared, with the development of distinct crystals of the monohydrate. By the time 190° C. was reached, the monohydrate itself was losing water, and crumbling to granular non-crystalline powder. The total water and the carbon were determined by combustion, the carbon content probably being somewhat low. In any case the presence of an indeterminate quantity of organic impurities could not fail to lead to a slight deviation from the theoretical values.

The data seem to indicate, then, that the tetragonal form is a trihydrate, but that at least half a molecule and probably one molecule of the water is held in so loose a manner that it escapes in dry air without loss of transparency of the crystal, but with a slight increase in refractive indices. The second molecule of water begins to go off at slightly above 100° C., while the third is stable up to about 180° C.

The relatively weak double refraction, such that when observed between crossed nicols the crystals show only first order white or gray colors, together with the fact that every crystal (air-dried) exhibits in some direction the one refractive index 1.52, makes it possible to readily distinguish this form of calcium oxalate from the usual form.

Magnesium Oxalate Monohydrate.—Magnesium oxalate has been identified by microchemical methods in the pericarp of black pepper (*Piper nigrum*) by Plahl.[1] The authors have measured the optical constants of the minute crystals found in this tissue, as follows: Biaxial with large axial angle; negative; refractive indices $\alpha = 1.375$, $\beta = 1.525$, $\gamma = 1.570$, $\gamma - \alpha = 0.195$. The double refraction is thus extreme, and between crossed nicols the grains show fifth order colors, even when small. Magnesium oxalate prepared synthetically gave identically the same values, confirming the identification of the crystals in the pepper.

This substance can be readily distinguished from calcium oxalate monohydrate which it resembles, by measurement of the lowest refractive index α. This index is matched by methyl-ethyl ketone, and when this is used as the immersion liquid many of the crystals of magnesium oxalate will match it and disappear in certain positions, as the stage is revolved, while all the indices of calcium oxalate are higher, so that they will remain visible, and on raising the microscope tube light will seem to enter them. It has been impossible to identify this substance in any others of the drugs studied, but in examining plant materials in general the possibility of its presence should not be overlooked.

Potassium Hydrogen Oxalate.—This compound is present in the foliage of some species of *Rumex*[2] and other plants, but has not been observed in official drugs. It also resembles the calcium oxalate monohydrate, but has the refractive indices $\alpha = 1.415$, $\beta = 1.545$, $\gamma = 1.565$, and so can be distinguished by matching its lowest index by the immersion liquid isoamyl isovalerate.

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[1] W. Plahl, *Arch. Chem. Mikrosc.*, 5, 320–329, 1912.

[2] Cf. G. P. Walton, *Bot. Gaz.*, 74, 158–173, 1922.

In a few of the drugs, especially agaricus, belladonna, and myristica, crystals of properties unlike any thus far described were observed. The nature of these substances is as yet undetermined.

OBSERVATIONS ON INDIVIDUAL DRUGS.

The data for the individual drugs studied are given in the following form:

Name: Official name; botanical name; number of specimen studied.[1]

Description: Quotations from U. S. Pharmacopœia, IX (U. S. P.) or National Formulary, 4th edition, 1916 (N. F.).

Observations: Supplementary remarks on the descriptive quotations and notes on crystallographic features. The crystals are understood to have shown the optical properties characteristic of calcium oxalate monohydrate, except where otherwise stated. The figure numbers refer to Figure 2.

ABSINTHIUM (*Artemisia Absinthium;* M. 37311).

Description: "Calcium oxalate crystals in rosette aggregates about 0.01 mm. in diameter." (N. F.)

Observations: The rosettes are rather sparse; their fragments represent broken crystals like Fig. 2*a*.

AGARICUS (*Polyporus officinalis;* M. 37999).

Description: "Many cubical crystals of calcium oxalate from 0.01 to 0.02 mm. in diameter." (N. F.)

Observations: Shows large rosette aggregates, as well as single crystals of calcium oxalate, not cubical but like Fig. 2*a*.

The large crystals of cubical aspect also present show double refraction and hence do not belong to the cubic system. They are optically distinct from calcium oxalate, but their identity is unknown. Tunmann[2] suggests that they may be magnesium or potassium compounds of resinic or agaric acids. The published description would accordingly seem to require revision.

ALETRIS (*Aletris farinosa;* M. 37310).

Description: "Raphides *** from 0.025 to 0.045 mm. length." (N. F.)

Observations: The raphides or needle-like crystals are not numerous; they are mostly like Fig. 1*d*, occasionally 2*d*.

ALTHAEA (*Althaea officinalis;* M. 28034).

Description: "Calcium oxalate crystals few, in rosette aggregates from 0.02 mm. to 0.03 mm. in diameter." (U. S. P. IX.)

Observations: The rosettes become, in the powdered drug, broken up into angular flakes; there are also occasional complete crystals or twins. Forms, Figs. 2*c* and 3*c*.

ALTHAEA FOLIA (*Althaea officinalis;* M. 37313).

Description: "Calcium oxalate in rosette aggregates up to 0.025 mm. in diameter." (N. F.)

Observations: The rosettes are more or less broken up into angular fragments, of the form 2*c*.

ANISUM (*Pimpinella anisum;* M. 36738).

Description: "Cells *** containing a small rosette aggregate of calcium oxalate." (U. S. P. IX.)

Observations: The rosettes are very small and fragments are difficult to locate; those studied represented broken crystals like Fig. 2*a*.

APII FRUCTUS (*Apium graveolens;* M. 37283).

Description: "Cells containing fixed oil and aleurone grains, the latter each containing a small rosette aggregate of calcium oxalate." (N. F.)

Observations: The rosettes are small and not numerous; some of the fragments resemble Fig. 2*a*. Small rhombs are also occasional, Fig. 2*b*.

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[1] The numbers used are serial numbers of the collection of the Microchemical Laboratory Bureau of Chemistry.

[2] O. Tunmann, *Schweiz. Wochsch. Chem. Pharmazie.* 47, 157–164, 1909; *Pflanzenmikrochemie*, p. 153 (1913).

ARALIA (*Aralia racemosa;* M. 37309).

Description: "Rosette aggregates of calcium oxalate from 0.03 to 0.07 mm. in diameter." (N. F.)

Observations: The rosettes are not numerous; fragments are represented by Fig. 2*a*.

ASCLEPIAS (*Asclepias tuberosa;* M. 37314).

Description: "Calcium oxalate crystals in rosette aggregates up to 0.04 mm. in diameter." (N. F.)

Observations: The rosettes are numerous; broken fragments are like Fig. 2*a*.

ASPIDOSPERMA (*Aspidosperma Quebracho blanco;* M. 36886).

Description: "Crystals being in prisms frequently terminated by pyramids and from 0.008 to 0.03 mm. in length." (U. S. P. IX.)

Observations: The crystals are numerous, mostly like Figs. 2*a*, 3*a* and 3*b*. They frequently lie on face *x* and then do not extinguish well, one optic axis being approximately perpendicular to this face, showing only index β.

AURANTII DULCIS CORTEX (Sweet Orange Peel; M. 37106).

Description: "Occasional membrane crystals of calcium oxalate in monoclinic prisms, from 0.02 to 0.035 mm. in diameter." (U. S. P. IX.)

Observations: The crystals are numerous, largely like Figs. 3*a*, 3*b* and 3*c*, with some 2*a*.

Note: Bitter Orange Peel (*Aurantii amari cortex*) showed forms similar to the above.

BELLADONNÆ FOLIA (*Atropa Belladonna;* M. 36764).

Description: "Calcium oxalate in sphenoidal micro-crystals." (U. S. P. IX.)

Observations: Very small sphenoidal crystals are numerous, but are *not* calcium oxalate monohydrate, for this substance is holohedral and not sphenoidal in crystallization. Moreover, their highest refractive index, $\gamma = 1.63$, is distinctly less than the corresponding value for calcium oxalate, while their lowest index, $\alpha = 1.50$, is slightly greater. Their nature is unknown, and the description might well indicate this fact.

BELLADONNÆ RADIX (*Atropa Belladonna;* M. 36765).

Description: "Sphenoidal micro-crystals numerous, from 0.003 to 0.010 mm. in length." (U. S. P. IX.)

Observations: The crystals are identical with those in the leaves of the same plant, just described, and are not calcium oxalate.

BRAYERA (*Hagenia abyssinica;* M. 37996).

Description: "Rosette aggregates of calcium oxalate up to about 0.075 mm. in diameter." (N. F.)

Observations: The rosettes are not abundant; fragments are represented by Fig. 2*a*.

BUCHU (*Barosma betulina,* M. 36804, and *Barosma serratifolia,* M. 36808).

Description: Not described as containing calcium oxalate in U. S. P. IX.

Observations: Rosettes are present but not abundant, in both species. Fragments from these showed the optical properties of calcium oxalate monohydrate, being represented by Figs. 2*a* or 2*b*.

CACAO PRAEPARATA (*Theobroma Cacao;* M. 38026).

Description: Not described as containing calcium oxalate in the National Formulary.

Observations: Crystals can be located, though only with difficulty, in the powdered nibs, occurring for the most part in rosettes of minute micro-crystals. Optical data could not be obtained with certainty on these crystals. Occasionally, in the perisperm tissues are seen forms resembling Figs. 2*a* and 3*c*, and the substance is probably calcium oxalate.

CACTUS (*Selencereus* (formerly *Cactus*) *grandiflorus;* M. 38270).[1]

Description: "Spongy parenchyma containing large crystals and raphides of calcium oxalate." (N. F.)

Observations: The raphides or needle-like crystals (Fig. 1*d*) are frequent, and crystals like Fig. 3*c* occasional; both were found to be calcium oxalate monohydrate. In addition, a considerable quantity of tetragonal calcium oxalate is present in the form of irregular fragments, showing $\omega = 1.520$ and $\epsilon = 1.545$; this might well be mentioned in the description.

CALENDULA (*Calendula officinalis;* M. 37284).

Description: "Rosette aggregates of calcium oxalate from 0.002 to 0.004 mm. in diameter." (N. F.)

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[1] Kindly furnished by Dr. J. N. Rose of the Smithsonian Institution.

Observations: Besides the rosettes, fragments of which are like Fig. 2*a*, prisms represented by Fig. 3*a* are occasional.

CALUMBA (*Jateorhiza palmata;* M. 36755).

Description: " ***containing one or more prisms of calcium oxalate from 0.01 to 0.03 mm. in length, or numerous sphenoidal micro-crystals." (U. S. P. IX.)

Observations: Crystals like Fig. 2*c* are present but scarce; no sphenoidal micro-crystals were observable in the specimen examined.

CANELLA (*Canella Winterana* (*alba*); M. 38252).

Description: "Calcium oxalate in rosette aggregates up to 0.05 mm. in diameter." (N. F.)

Observations: Rosettes are numerous.

CANNABIS (*Cannabis sativa;* M. 36754).

Description: "Rosette aggregates of calcium oxalate from 0.005 to 0.025 mm. in diameter." (U. S. P. IX.)

Observations: Besides the aggregates there are a large number of minute irregular flakes, evidently broken from the rosettes, represented by Figs. 2*a* and 2*b*.

CARUM (*Carum Carvi;* M. 36761).

Description: "Aleurone grains *** not infrequently containing a small rosette aggregate or prism of calcium oxalate." (U. S. P. IX.)

Observations: The drug occasionally shows very minute crystals resembling Figs. 2*a* and 2*b*.

CARDAMOMUM SEMEN (*Elletaria Cardamomum;* M. 36749).

Description: "In mounts made with hydrated chloral T. S. single prisms or crystals in rosette aggregates may separate in the cells of the endosperm and perisperm." (U. S. P. IX.)

Observations: Crystals like Fig. 1*b* are numerous, while occasionally 2*b* is represented.

CARYOPHYLLUS (*Eugenia aromatica;* M. 36758).

Description: "Calcium oxalate in rosette aggregates from 0.01 to 0.015 mm. in diameter." (U. S. P. IX.)

Observations: The rosettes are numerous, the fragments broken from them being represented by Fig. 2*b;* crystals like Fig. 1*b* are also occasionally present.

CASCARA SAGRADA (*Rhamnus Purshiana;* M. 36891).

Description: "*** the crystals *** being in the form of monoclinic prisms from 0.008 to 0.015 mm. in length." (U. S. P. IX.)

Observations: The crystals are numerous, the principal forms corresponding to Figs. 1*b*, 1*c*, 2*b* and 3*c*.

CASCARILLA (*Croton Eluteria;* M. 37285).

Description: "Calcium oxalate in monoclinic crystals." (N. F.)

Observations: Rosettes and prisms are occasional in the powdered drug. Fragments from the rosettes show forms corresponding to Fig. 2*a*, while the prisms are usually twinned, like 3*a*.

CASSIA FISTULA (*Cathartocarpus Fistula;* M. 38031).

Description: Not described as containing calcium oxalate in National Formulary.

Observations: Crystals with the properties of calcium oxalate monohydrate occur, although they are not numerous, in the pod; the forms are represented by Figs. 1*a*, 1*b*, 1*c*, 2*a* and 3*a*. They are less numerous in the pulp and seed, but forms like 2*a* could be occasionally located.

CASTANEA (*Castanea dentata;* M. 37286).

Description: "Numerous calcium oxalate crystals in rosette aggregates or in monoclinic prisms, from 0.01 to 0.04 mm. in diameter." (N. F.)

Observations: The rosettes are numerous, fragments being represented by Fig. 2*a*.

CHIMAPHILA (*Chimaphila umbellata;* M. 37287).

Description: "Calcium oxalate in rosette aggregates mostly about 0.035 mm. in diameter occasionally up to 0.065 mm. in diameter." (N. F.)

Observations: The rosette aggregates are not numerous; fragments are like Fig. 2*a*.

CHIONANTHUS (*Chionanthus Virginica;* M. 38043).

Description: Not described as containing calcium oxalate in National Formulary.

Observations: Crystals are present, though not numerous; the forms occurring are shown by Figs. 1*a*, 1*d*, and 3*b*, the properties being those of calcium oxalate monohydrate.

CINCHONA (*Cinchona Calisaya;* M. 36903).

Description: "Sphenoidal micro-crystals of calcium oxalate numerous." (U. S. P. IX.)

Observations: The sphenoidal or triangular crystal grains are too small to establish their identity, but occasional crystals like Figs. 1*b* and 2*b*, evidently calcium oxalate monohydrate, were observed.

CINCHONA RUBRA (*Cinchona succirubra;* M. 36762).

Description: "Sphenoidal micro-crystals of calcium oxalate, resembling those in cinchona." (U. S. P. IX.)

Observations: As in the preceding drug.

CINNAMOMUM SAIGONICUM (Saigon Cinnamon; M. 36766).

Description: "Cells *** either filled with starch or containing very small raphides of calcium oxalate." (U. S. P. IX.)

Observations: The raphides or needles are not abundant, although often occurring in bundles; they represent Figs. 1*d* and 2*d*.

CINNAMOMUM ZEYLANICUM (*Cinnamomum zeylanicum;* M. 36904).

Description: "Calcium oxalate in raphides, from 0.005 to 0.008 mm. in length." (U. S. P. IX.)

Observations: The small needles occur rather abundantly; the majority of them correspond to Fig. 1*d*, some to 2*d*.

CONDURANGO (*Marsdenia Condurango;* M. 37288).

Description: "Rosette aggregates of calcium oxalate from 0.015 to 0.04 mm. in diameter." (N. F.)

Observations: Beside the rosettes there are prisms, represented by Figs. 1*a* and 1*b*.

CONIUM (*Conium maculatum;* M. 37289).

Description: "Rosette aggregates of calcium oxalate, the latter from 0.002 to 0.006 mm. in diameter." (N. F.)

Observations: The rosettes are very small and few in number; fragments show the form represented by Fig. 1*a*.

CONVALLARIAE FLORES (*Convallaria majalis;* M. 37656).

Description: "Calcium oxalate in raphides up to 0.04 mm. in length." (N. F.)

Observations: The raphides or needles are not numerous; they are mostly like Fig. 1*d*, occasionally 2*d*.

CONVALLARIAE RADIX (*Convallaria majalis;* M. 37290).

Description: "Raphides of calcium oxalate few, from 0.02 to 0.045 mm. in length." (N. F.)

Observations: Identical with the preceding drug.

CORIANDRUM (*Coriandrum sativum;* M. 37767).

Description: "Calcium oxalate crystals numerous, from 0.003 to 0.01 mm. in diameter, mostly in rosette aggregates, either isolated or in aleurone grains." (U. S. P. IX.)

Observations: In the specimen examined there are only crystal fragments, which are very small and not abundant; those that could be studied seemed to be broken from crystals like Fig. 2*b*.

CORNUS (*Cornus florida;* M. 38126).

Description: Not described as containing calcium oxalate in National Formulary.

Observations: The drug contains numerous rosette aggregates, and also single prisms, represented by Figs. 2*a*, 3*b* and 3*c*, and possessing the properties of calcium oxalate monohydrate.

CORYDALIS (*Bicuculla canadensis;* M. 37291).

Description: "Very few rosette aggregates of calcium oxalate up to 0.02 mm. in diameter, from the portions of rhizome of *Bicuculla canadensis*." (N. F.)

Observations: The rosettes are not numerous; they yield fragments of crystals like Fig. 2*b*.

CUBEBA (*Piper Cubeba;* M. 36768).

Description: "Occasionally a crystal of calcium oxalate." (U. S. P. IX.)

Observations: The drug was found to contain numerous small crystals like Fig. 1*b*.

CYPRIPEDIUM (*Cypripedium hirsutum;* M. 38268).

Description: "Calcium oxalate in raphides up to 0.065 mm. in length and occurring isolated or in bundles, occasionally imbedded in a mucilage-like plasma." (N. F.)

Observations: The raphide bundles are not numerous, and are so firmly embedded in mucilage-like plasma as to be separated with difficulty for the purpose of optical study. Needles that could be isolated resembled Fig. 1*d*.

DAMIANA (*Turnera diffusa;* M. 37995).

Description: "Numerous crystals of calcium oxalate in rosette aggregates up to 0.03 mm. in diameter and occasionally in prisms." (N. F.)

Observations: The fragments from the rosette aggregates are represented by Fig. 2*b;* no prisms noted.

DIOSCOREA (*Dioscorea villosa;* M. 38269).

Description: Not described as containing calcium oxalate in National Formulary.

Observations: Calcium oxalate monohydrate is present in the form of raphides, though not abundant; they are represented by Fig. 1*d*.

ERIODICTYON (*Eriodictyon californicum;* M. 36802).

Description: Not described as containing calcium oxalate in U. S. P. IX.

Observations: Rosettes of calcium oxalate monohydrate are occasional though not numerous; they usually average from 0.02 to 0.03 mm. in diameter. Fragments from them are like Figs. 2*c* and 3*c*.

EUCALYPTUS (*Eucalyptus globulus;* M. 36747).

Description: "Calcium oxalate crystals *** in the form of rosette aggregates or monoclinic prisms varying from 0.015 to 0.025 mm. in diameter." (U. S. P. IX.)

Observations: The large number of different forms of crystals correspond to Figs. 1*a*, 1*b*, 1*c*, 2*b* and 3*c*.

EUONYMUS (*Euonymus atropurpureus;* M. 37293).

Description: "Calcium oxalate in rosette aggregates from 0.015 to 0.035 mm. in diameter, the amount in different specimens showing some variation." (N. F.)

Observations: The rosettes are not numerous; fragments are represented by Fig. 2*b*.

FRANGULA (*Rhamnus Frangula;* M. 37531).

Description: "Prismatic crystals of calcium oxalate varying from 0.007 mm. to 0.015 mm. in diameter." (U. S. P. IX.)

Observations: Various habits of crystals are numerous, Figs. 1*a*, 1*b*, 2*a*, 3*a*, and 3*c*, as well as irregular flakes, being represented.

GALANGAL (*Alpinia officinarum;* M. 38130).

Description: Not described as containing calcium oxalate in National Formulary.

Observations: Rosette aggregates are present in the powdered drug, though not numerous; irregular fragments from these proved to have the properties of calcium oxalate monohydrate.

GALEGA (*Galega officinalis;* M. 38135).

Description: Not described as containing calcium oxalate in National Formulary.

Observations: The drug contains numerous prisms, the largest proportion of them being represented by Figs. 1*b*, 2*a*, 3*a* and 3*b*, undoubtedly calcium oxalate monohydrate.

GALLA (Nutgalls; M. 38051).

Description: Not described as containing crystals in U. S. P. IX.

Observations: Crystals of calcium oxalate monohydrate were found to be rather numerous in the sample examined, consisting of forms similar to those found in the bark of *Quercus alba* (Figs. 1*b*, 1*c*, 2*a*, 3*a*); rosette aggregates are also rather numerous. Since nutgalls are excrescences on the young twigs of *Quercus* species, it is possible that these crystals had their origin in the oak tissues, and some samples may not contain them.

GELSEMIUM (*Gelsemium sempervirens;* M. 36763).

Description: "Calcium oxalate in monoclinic prisms from 0.015 to 0.03 mm. in diameter." (U. S. P. IX.)

Observations: The crystals correspond to Figs. 1*c*, 2*c*, 3*a* and 3*c;* irregular flakes are also frequently present.

GERANIUM (*Geranium maculatum;* M. 38058).

Description: Not described as containing calcium oxalate in National Formulary.

Observations: The drug contains numerous large rosettes and fragments broken from them, also prisms represented by Figs. 2*a*, 2*c* and 3*c*, all undoubtedly calcium oxalate monohydrate.

GLYCYRRHIZA (*Glycyrrhiza glabra* (Spanish Licorice); M. 36729).

Description: "Cells *** containing numerous starch grains, or prisms of calcium oxalate." (U. S. P. IX.)

Observations: Relatively large crystals like Figs. 2*a* and 3*a* are abundant. They occasionally lie on face *x*, do not extinguish well, and show only index *β*.

GOSSYPII CORTEX (*Gossypium herbaceum;* M. 37316).

Description: "Rosette aggregates of calcium oxalate from 0.009 to 0.025 mm. in diameter." (N. F.)

Observations: The rosettes are numerous, fragments usually resembling Fig. 2*b*.

GRANATUM (*Punica Granatum;* M. 37760).

Description: "Calcium oxalate crystals in rosette aggregates, monoclinic prisms or crystal fibers, the individual crystals from 0.01 to 0.018 mm. in diameter." (U. S. P. IX.)

Observations: The rosettes are very numerous; the individual crystals correspond to Figs. 1*b* and 1*c*.

HAEMATOXYLON (*Haematoxylon campechianum;* M. 37994).

Description: "Wood parenchyma with occasional crystals of calcium oxalate." (N. F.)

Observations: The drug shows numerous prisms, represented by Figs. 2*a* and 3*b*.

HAMAMELIDIS FOLIA (*Hamamelis virginiana;* M. 37318).

Description: "Calcium oxalate in monoclinic prisms, from 0.01 to 0.035 mm. in diameter." (N. F.)

Observations: The prisms are numerous, being represented by Figs. 1*b*, 2*a* and 3*c*.

HELONIAS (*Chamaelirium luteum;* M. 37295).

Description: "Numerous raphides varying from 0.025 to 0.035 mm. in length." (N. F.)

Observations: The separated needles or raphides are like 1*d*, occasionally 2*d*.

HYDRANGEA (*Hydrangea arborescens;* M. 37369).

Description: "Raphides numerous, from 0.07 to 0.13 mm. in length." (N. F.)

Observations: The single needles are represented by Fig. 1*d* and occasionally by 2*d*.

HYOSCYAMUS (*Hyoscyamus niger;* M. 36732).

Description: "Calcium oxalate crystals usually in the form of 4- to 6-sided, isolated prisms, sometimes in twins, from 0.015 to 0.025 mm. in length, also occurring in spherical aggregates, 0.02 mm. in diameter, and occasionally in sphenoidal micro-crystals." (U. S. P. IX.)

Observations: Examination showed the presence of numerous crystals and irregular fragments, but they do not represent calcium oxalate monohydrate. Their index lengthwise is about 1.525, that crosswise 1.545, showing them to be the tetragonal form of calcium oxalate which might well be noted in the description.

IGNATIA (*Strychnos Ignatii;* M. 38062).

Description: Not described as containing calcium oxalate in National Formulary.

Observations: Crystalline material with the properties of calcium oxalate monohydrate is present though very scarce in this drug; the only form found was that represented by Fig. 2*a*.

IPECACUANHA (*Cephaëlis Ipecacuanha;* M. 36745).

Description: "Calcium oxalate in raphides from 0.015 to 0.04 mm. in length, few." (U. S. P. IX.)

Observations: The raphides or needles are not numerous; those found are mostly like Fig. 1*d*, occasionally 2*d*.

IRIS (*Iris florentina;* M. 37298).

Description: "Calcium oxalate in large prisms up to 0.5 mm. in length." (N. F.)

Observations: The fragments from the prisms are usually of the form represented by Fig. 3*c*.

IRIS VERSICOLOR (*Iris versicolor;* M. 37297).

Description: "Calcium oxalate in prisms, up to 0.35 mm. in length. (N. F.)

Observations: Same as preceding.

JALAPA (*Exogonium Purga;* M. 36740).

Description: "Calcium oxalate in rosette aggregates from 0.01 to 0.035 mm. in diameter." (U. S. P. IX.)

Observations: Fragments of the rosettes appear to be broken from crystals like Figs. 1*b* or 2*b*.

JUGLANS (*Juglans cinerea;* M. 37299).

Description: "Calcium oxalate from 0.01 to 0.05 mm. in length. (N. F.)

Observations: The drug contains both large rosette aggregates and prisms. Fragments of the former are represented by Fig. 2*c*, the prisms by Figs. 1*b*, 2*a*, 2*b*, and 3*c*.

JUNIPERUS (*Juniperus communis;* M. 37300).

Description: "*** each enclosing a polygonal crystal of calcium oxalate." (N. F.)

Observations: The prisms are fairly numerous, being represented by Fig. 1*a*.

LAPPA (*Arctium Lappa;* M. 38065).

Description: Not described as containing calcium oxalate in National Formulary.

Observations: Occasional irregular fragments in the drug resemble calcium oxalate, although they could not be certainly identified; they sometimes have a form like Fig. 2*a*.

LIMONIS CORTEX (*Citrus medica;* M. 36748).

Description: "Occasionally membrane crystals of calcium oxalate." (U. S. P. IX.)

Observations: The crystals are not numerous, although irregular flakes, also crystals like Figs. 1*a*, 2*a* and 3*c*, can be located without difficulty.

MALVAE FOLIA (*Malva sylvestris;* M. 37319).

Description: "Rosette crystals of calcium oxalate. (N. F.)

Observations: The rosettes are numerous, fragments being represented by Fig. 2*b*.

MATICO (*Piper angustifolium;* M. 38267).

Description: "Calcium oxalate crystals few in parenchyma tissue of the venation, in the form of raphides or monoclinic prisms." (N. F.)

Observations: The crystals are scarce, prisms represented by Figs. 1*a*, 1*b* and 2*b*, also needles like 1*d*, being only occasionally found.

MELILOTUS (*Melilotus officinalis;* M. 38265).

Description: Not described as containing calcium oxalate in National Formulary.

Observations: Small, single prismatic crystals with the properties of calcium oxalate monohydrate are present though not abundant in the drug, many being represented by Figs. 1*b*, 2*a*, 3*a* and 3*b*.

MYRICA (*Myrica cerifera;* M. 37320).

Description: "Crystals of calcium oxalate in monoclinic prisms up to 0.02 mm. in diameter, or in rosette aggregates up to 0.035 mm. in diameter." (N. F.)

Observations: Fragments of rosettes resembled Fig. 1*a;* prisms resembled Figs. 2*a*, 2*b*, 3*a* and 3*c*.

MYRISTICA (*Myristica fragrans;* M. 36810).

Description: Not described as containing calcium oxalate in U. S. P. IX.

Observations: Rod-like and flat triangular crystals occur in the drug. Some of these crystals had a refractive index 1.49 in one direction, but a slightly lower index in the other direction. This indicates that these crystals do not represent calcium oxalate monohydrate, but the nature of the substance is unknown.

PAREIRA (*Chondodendron tomentosum;* M. 38085).

Description: Not described as containing calcium oxalate in National Formulary.

Observations: The drug contains numerous prismatic crystals, the different forms being represented by Figs. 1*a*, 1*b*, 2*b*, 3*a* and 3*c*, all showing the typical optical properties of calcium oxalate monohydrate.

PASSIFLORA (*Passiflora sp.;* M. 38266).

Description: Not described as containing calcium oxalate in National Formulary.

Observations: The drug showed the presence of rosette aggregates, the fragments of which proved to be calcium oxalate monohydrate.

PHYTOLACCA (*Phytolacca decandra;* M. 38096).

Description: Not described as containing calcium oxalate in National Formulary.

Observations: Needles are abundant in the drug, being usually represented by Fig. 1*d* and occasionally by Fig. 2*d;* they have the optical properties of calcium oxalate monohydrate.

PILOCARPUS (*Pilocarpus Jaborandi,* M. 36744, and *Pilocarpus microphyllus,* M. 36734).

Description: "Cells occasionally containing rosette aggregates of calcium oxalate from 0.01 to 0.025 mm. in diameter." (U. S. P. IX.)

Observations: The rosettes are numerous, as are also irregular fragments, evidently broken from them; Figs. 1*b* and 2*b* appear to be represented.

PIMENTA (*Pimenta officinalis;* M. 37321).

Description: "Rosette aggregates of calcium oxalate from 0.006 to 0.017 mm. in diameter." (N. F.)

Observations: The rosettes are numerous, fragments resembling Fig. 1*a*.

PINUS ALBA (*Pinus Strobus;* M. 37303).

Description: "Few monoclinic prisms of calcium oxalate about 0.02 mm. in diameter." (N. F.)

Observations: The crystals must be very scarce, as none could be definitely located in the specimen examined.

PIPER (*Piper nigrum;* M. 36805).

Description: Not described as containing calcium oxalate in U. S. P. IX.

Observations: A few minute crystals were present in the drug. While these had the general aspect of calcium oxalate monohydrate, trial with refractive index liquid 1.375 (methyl-ethyl ketone) showed them to have one index as low as this value, indicating them to represent the magnesium compound instead.

PODOPHYLLUM (*Podophyllum peltatum;* M. 36746).

Description: "Calcium oxalate crystals few; in rosette aggregates from 0.05 to 0.08 mm. in diameter and occasionally in raphides from 0.03 to 0.09 mm. in length." (U. S. P. IX.)

Observations: The rosettes are few and no needles or raphides were found. Fragments from the rosettes are numerous though small, representing broken crystals like Figs. 1*b* and 2*b*.

PRUNUS SEROTINA (*Prunus serotina;* M. 36751).

Description: "Calcium oxalate in crystals consisting of monoclinic prisms, from 0.015 to 0.04 mm. in diameter, also in rosette aggregates from 0.01 to 0.04 mm. in diameter." (U. S. P. IX.)

Observations: The drug is rich in crystals, especially those shown in Figs. 1*b*, 1*c*, 2*a* and 3*c*.

QUASSIA (*Picrasma excelsa;* M. 37188).

Description: "Calcium oxalate in crystal fibers near the medullary rays, in 4- to 6-sided prisms, from 0.006 to 0.03 mm. in length." (U. S. P. IX.)

Observations: The crystals are very numerous, their forms corresponding to Figs. 2*a*, 3*a* and 3*b*.

QUERCUS (*Quercus alba;* M. 37322).

Description: Not described as containing calcium oxalate crystals in National Formulary.

Observations: Large prisms and rosettes are numerous in the drug, forms represented by Figs. 1*b*, 1*c*, 2*a* and 3*a* being shown; all have the optical properties of calcium oxalate monohydrate.

QUILLAJA (*Quillaja Saponaria;* M. 37305).

Description: "Calcium oxalate in monoclinic pyramids and prisms from 0.035 to 0.2 mm. in length." (N. F.)

Observations: The crystals are very numerous, their forms being represented by Figs. 1*a*, 3*c* and probably 2*c*.

RHAMNUS CATHARTICA (*Rhamnus cathartica;* M. 38097).

Description: Not described as containing calcium oxalate in National Formulary.

Observations: Crystals with the properties of calcium oxalate monohydrate are present though not abundant in the drug; they are aggregated in rosettes, fragments from which are represented by Fig. 2*b*.

RHEUM (*Rheum officinale;* M. 36756).

Description: "*** It exhibits calcium oxalate in rosette aggregates, mostly from 0.05 to 0.1 mm. in diameter occasionally attaining a diameter of 0.15 mm." (U. S. P. IX.)

Observations: The rosettes are of relatively large size; irregular shaped fragments from them are numerous, Fig. 1*c* being most often represented.

RUBUS (*Rubus villosus;* M. 38136).

Description: Not described as containing calcium oxalate in National Formulary.

Observations: Rosette aggregates of calcium oxalate monohydrate are numerous in the drug, fragments from them being represented by Fig. 2*a* and occasionally 3*a*.

RUMEX (*Rumex crispus;* M. 37306).

Description: "Calcium oxalate crystals in rosette aggregates from 0.025 to 0.06 mm. in diameter." (N. F.)

Observations: The rosettes are numerous, irregular fragments resembling Figs. 1*a* and 2*b*. Since potassium hydrogen oxalate has been found in the foliage of some species of *Rumex* (see introduction) it was sought for in the drug. Evidence of its presence, however, was lacking, since

all of the fragments showed one index considerably more than the highest (1.565) of this substance.

SANTALUM ALBUM (*Santalum album;* M. 37307).

Description: "Single crystals of calcium oxalate." (N. F.)

Observations: Crystals are infrequent in the powdered drug, those studied, however, corresponding to calcium oxalate monohydrate.

SANTALUM RUBRUM (*Pterocarpus santalinus;* M. 36752).

Description: "Also occasional groups of crystal fibers with calcium oxalate in the form of monoclinic prisms from 0.01 to 0.02 mm. in diameter." (U. S. P. IX.)

Observations: Crystals occur fairly frequently in the drug and are relatively large in size. Figs. 2*a* and 3*a* seem to be most often represented.

SARSAPARILLA (*Smilax medica;* M. 36743).

Description: "Calcium oxalate in raphides, from 0.006 to 0.035 mm. in diameter, occurring singly or in groups." (U. S. P. IX.)

Observations: The needles are not numerous, and are difficult to release from the bundles. Figs. 1*d* and 2*d* are represented.

SCAMMONIAE RADIX (*Convolvulus Scammonia;* M. 36739).

Description: "Calcium oxalate crystals numerous, in monoclinic prisms from 0.01 to 0.045 mm. in length." (U. S. P. IX.)

Observations: The crystals are numerous, as are also irregular fragments. Forms like Figs. 2*b* and 3*c* seem to be characteristic, with 1*b* less frequent.

SCILLA (*Urginea maritima;* M. 36757).

Description: "While examined under the microscope it exhibits numerous single crystals and bundles of long raphides of calcium oxalate." (U. S. P. IX.)

Observations: Needles of two different sizes occur, some being ten times as large as others. Both sizes are numerous and correspond to Figs. 1*d* and 2*d*, and both have the properties of calcium oxalate monohydrate.

SENNA (*Cassia acutifolia;* M. 36742, and *Cassia angustifolia,* M. 36753).

Description: "Calcium oxalate in rosette aggregates, from 0.009 to 0.01 mm. in diameter, and 4- to 6-sided prisms, about 0.015 mm. in length, usually in crystal fibers." (U. S. P. IX.)

Observations: The crystals correspond to Figs. 1*a*, 1*b*, 2*a* and 3*a*.

STILLINGIA (*Stillingia sylvatica;* M. 36737).

Description: "Occasionally crystals of calcium oxalate in rosette aggregates about 0.035 mm. in diameter." (U. S. P. IX.)

Observations: The rosettes are only occasional; irregular fragments are also few, broken from crystals like Fig. 2*b*.

STRAMONIUM (*Datura Stramonium;* M. 36741).

Description: "Calcium oxalate either in rosette aggregates, from 0.01 to 0.02 mm. in diameter, or in rod-like crystals, or in the form of sphenoidal micro-crystals." (U. S. P. IX.)

Observations: The rosettes are numerous; irregular fragments from them represent broken crystals like Figs. 1*b* and 2*b*.

TRIFOLIUM (*Trifolium pratense;* M. 38114).

Description: Not described as containing calcium oxalate in National Formulary.

Observations: The drug contains numerous very small prisms, many of the forms present being represented by Figs. 1*a*, 2*a*, 3*a* and 3*b*, and all showing the optical properties of calcium oxalate monohydrate.

ULMUS (*Ulmus fulva;* M. 36759).

Description: "Calcium oxalate in monoclinic prisms, mostly in crystal fibers, the individual crystals from 0.01 to 0.025 mm. in diameter." (U. S. P. IX.)

Observations: The crystals are numerous, Figs. 1*c*, 2*a*, 2*b* and 3*a* being most often represented.

UVA URSI (*Arctostaphylos Uva-ursi;* M. 36730).

Description: "*** crystal fibers with monoclinic prisms, from 0.006 to 0.015 mm. in diameter." (U. S. P. IX.)

Observations: Crystals like Figs. 1*b*, 2*b* and 3*a* are abundant, and represent calcium oxalate monohydrate.

VANILLA (*Vanilla planifolia;* M. 37325).

Description: "Bundles of raphides of calcium oxalate." (N. F.)

Observations: The powdered fruit showed numerous raphide bundles and broken fragments of crystals. However, it proved impossible to bring the crystal fragments into close enough contact with liquids for the determination of refractive indices, so that their identification as calcium oxalate could not be confirmed.

VERATRUM VIRIDE (*Veratrum viride;* M. 28234).

Description: "Calcium oxalate in raphides, from 0.015 to 0.15 mm. in length." (U. S. P. IX.)

Observations: The needles are numerous, mostly like Fig. 1*d*, and occasionally 2*d*.

VIBURNUM OPULUS (*Viburnum Opulus;* M. 37308).

Description: "Calcium oxalate in rosette aggregates, 0.015 to 0.04 mm. in diameter." (N. F.)

Observations: The drug is rich in rosettes and irregular fragments, the latter resembling Figs. 1*a* and 2*b*.

VIBURNUM PRUNIFOLIUM (*Viburnum prunifolium;* M. 36735).

Description: "Crystals of calcium oxalate from 0.015 to 0.035 mm. in diameter, occurring mostly in rosette aggregates, occasionally in crystal fibers; monoclinic prisms of calcium oxalate few." (U. S. P. IX.)

Observations: The rosettes are numerous, as are also irregular fragments broken from forms represented by Figs. 1*a*, 2*a* and 3*a*.

XANTHOXYLI FRUCTUS (*Xanthoxylum americanum;* M. 38116).

Description: Not described as containing calcium oxalate in National Formulary.

Observations: The capsule material was found to contain rosette aggregates of calcium oxalate monohydrate, readily located but not abundant. Fragments from these rosettes are represented by Figs. 1*a* and 3*c*. The seeds did not show the presence of crystals.

XANTHOXYLUM (*Xanthoxylum americanum;* M. 36750).

Description: "Calcium oxalate chiefly in monoclinic prisms from 0.01 to 0.025 mm. in diameter, occurring in crystal fibers and in parenchyma cells of the primary cortex." (U. S. P. IX.)

Observations: The crystals, and irregular fragments, are numerous, usually like Fig. 1*b*, also 1*a* and 3*a*.

TABLE 1.—Calcium Oxalate Monohydrate Present in More or Less Well Defined Prismatic Crystals, the Types Occurring Most Characteristically or Frequently Being Indicated by Numbers Corresponding to Those on Figure 2.

Agaricus[1]	2*a*	Cubeba	1*b*
Althaea[1]	2*c*, 3*c*	Eucalyptus[2]	1*a*–*c*, 2*b*, 3*c*,
Apii fructus[1]	2*b*	Frangula[2]	1*a*, 1*b*, 2*a*, 3*a*, 3*c*
Aspidosperma[2]	2*a*, 3*a*, 3*b*	Galega[2,3]	1*b*, 2*a*, 3*a*, 3*b*
Aurantii amari cortex[2]	2*a*, 3*a*, 3*b*, 3*c*	Galla[1,3]	1*b*, 1*c*, 2*a*, 3*a*
Aurantii dulcis cortex[2]	2*a*, 3*a*, 3*b*, 3*c*	Gelsemium	1*c*, 2*c*, 3*a*, 3*c*
Cactus[1]	3*c*	Geranium[1,2,3]	2*a*, 2*c*, 3*c*
Calendula[1]	3*a*	Glycyrrhiza[2]	2*a*, 3*a*
Calumba	2*c*	Granatum[1]	1*b*, 1*c*
Carum	2*a*, 2*b*	Haematoxylon[2]	2*a*, 3*b*
Cardamomum semen	1*b*, 2*b*	Hamamelidis folia[2]	1*b*, 2*a*, 3*c*
Caryophyllus[1]	1*b*	Ignatia[3]	2*a*
Cascara sagrada[2]	1*b*, 1*c*, 2*b*, 3*c*	Iris	3*c*
Cascarilla[1]	3*a*	Iris versicolor	3*c*
Cassia fistula[3]	1*a*–*c*, 2*a*, 3*a*	Juglans[1,2]	1*b*, 2*a*, 2*b*, 3*c*
Chionanthus[1,3]	1*a*, 3*b*	Juniperus	1*a*
Cinchona[1]	1*b*, 2*b*	Limonis cortex	1*a*, 2*a*, 3*c*
Cinchona rubra[1]	1*b*, 2*b*	Matico[1]	1*a*, 1*b*, 2*b*
Condurango[1]	1*a*, 1*b*	Melilotus[3]	1*b*, 2*a*, 3*a*, 3*b*
Cornus[1,3]	2*a*, 3*b*, 3*c*	Myrica[1,2]	2*a*, 2*b*, 3*a*, 3*c*

Pareira[2,3]	1*a*, 1*b*, 2*b*, 3*a*, 3*c*	Scammoniae radix[2]	1*b*, 2*b*, 3*c*
Prunus serotina[2]	1*b*, 1*c*, 2*a*, 3*c*	Senna[1]	1*a*, 1*b*, 2*a*, 3*a*
Quassia[2]	2*a*, 3*a*, 3*b*	Trifolium[3]	1*a*, 2*a*, 3*a*, 3*b*
Quercus[1,2,3]	1*b*, 1*c*, 2*a*, 3*a*	Ulmus[2]	1*c*, 2*a*, 2*b*, 3*a*
Quillaja[2]	1*a*, 2*c*, 3*c*	Uva ursi[2]	1*b*, 2*b*, 3*a*
Santalum rubrum	2*a*, 3*a*	Xanthoxylum[2]	1*a*, 1*b*, 3*a*

[1] Included also in one of the other lists.

[2] Especially rich in crystals of large size and perfection.

[3] Not recorded as containing calcium oxalate in U. S. P. IX or N. F.

TABLE 2.—Calcium Oxalate Monohydrate Present in Rosettes of Crystals, or Fragments Broken from Them, the Types of Crystals Which These Most Frequently Appear to Represent Being Indicated by Numbers.

Absinthium	2*a*	Galangal[3]	irreg.
Agaricus[1]	irreg.	Galla[1,3]	irreg.
Althaea[1]	2*c*, 3*c*	Geranium[1,2,3]	irreg.
Althaea folia	2*c*	Gossypii cortex[2]	2*b*
Anisum	2*a*	Granatum[1,2]	irreg.
Apii fructus[1]	2*a*	Jalapa	1*b*, 2*b*
Aralia	2*a*	Juglans[1,2]	2*c*
Asclepias[2]	2*a*	Malvae folia[2]	2*b*
Brayera	2*a*	Myrica[1,2]	1*a*
Buchu[2]	2*a*, 2*b*	Passiflora[3]	irreg.
Calendula[1]	2*a*	Pilocarpus[2]	1*b*, 2*b*
Canella	irreg.	Pimenta[2]	1*a*
Cannabis	2*a*, 2*b*	Podophyllum	1*b*, 2*b*
Caryophyllus[1,2]	2*b*	Quercus[1,2,3]	1*b*, 1*c*, 2*a*
Cascarilla[1]	2*a*	Rhamnus cathartica[3]	2*b*
Castanea	2*a*	Rheum[2]	1*c*
Chimaphila	2*a*	Rubus[2,3]	2*a*, 3*a*
Condurango[1,2]	irreg.	Rumex[2]	1*a*, 2*b*
Conium	1*a*	Senna[1,2]	irreg.
Cornus[1,3]	irreg.	Stillingia	2*b*
Corydalis	2*b*	Stramonium[2]	1*b*, 2*b*
Damiana[2]	2*b*	Viburnum opulus[2]	1*a*, 2*b*
Eriodictyon[2]	2*c*, 3*c*	Viburnum prunifolium[2]	1*a*, 2*a*, 3*a*
Euonymus	2*b*	Xanthoxyli fructus[3]	1*a*, 3*c*

[1] Included also in one of the other lists.

[2] Especially rich in large or typical rosettes.

[3] Not recorded as containing calcium oxalate in U. S. P. IX or N. F.

TABLE 3.—Calcium Oxalate Monohydrate Present in Acicular Crystals or Raphides, the Types Represented Being Numbered as in Tables 1 and 2.*

Aletris	1*d*, 2*d*	Helonias[2]	1*d*, 2*d*
Cactus[1,2]	1*d*	Hydrangea[2]	1*d*, 2*d*
Chionanthus[1,3]	1*d*	Ipecacuanha	1*d*, 2*d*
Cinnamomum saigonicum	1*d*, 2*d*	Matico[1]	1*d*
Cinnamomum zeylanicum[2]	1*d*, 2*d*	Phytolacca[2,3]	1*d*, 2*d*
Convallariae flores	1*d*, 2*d*	Sarsaparilla	1*d*, 2*d*
Convallariae radix	1*d*, 2*d*	Scilla[2]	1*d*, 2*d*
Cypripedium	1*d*	Veratrum viride[2]	1*d*, 2*d*
Dioscorea[3]	1*d*		

* It is noteworthy that most of the monocotyledonous plants used as drugs are in this list.

TABLE 4.—Calcium Oxalate Monohydrate Present in Irregular Flakes the Derivation of Which Is Indeterminate, or in Poorly Developed Crystals (When Any Crystal Outlines Are Recognizable, They Are Numbered).

Cinchona[1]	triang.	Coriandrum	2*b*
Cinchona rubra[1]	triang.	Santalum album	1*b*

TABLE 5.—Tetragonal Calcium Oxalate Present.

Cactus[1] Hyoscyamus

TABLE 6.—Crystals Present Probably Calcium Oxalate but not Certainly Identified.

Cacao praeparata[3]	2*a*, 3*c* (?)	Vanilla	1*d* (?)
Lappa[3]	2*a* (?)		

TABLE 7.—Crystals Present Magnesium Oxalate Monohydrate.

Piper

TABLE 8.—Crystals Present from Unknown Substances.

Agaricus[1] Belladonnæ radix
Belladonnæ folia Myristica

TABLE 9.—Calcium Oxalate Reported, but not Found.

Gentiana lutea[4] Pinus alba

TABLE 10.—Not Available for Study.

Cocillana

[1] Also included in one of the other lists.
[2] Especially rich in typical crystals.
[3] Not recorded as containing calcium oxalate in U. S. P. IX or N. F.
[4] H. Zornig, Schweiz. Apoth.-Zeit., 60, 725, Dec. 1922.

TABLE 11.—No Crystals of Calcium Oxalate or of Any Substance Resembling It Present.

Aconitum	Delphinium	Mentha Viridis
Adonis	Digitalis	Menyanthes
Allium sativum	Drosera	Mezereum
Amygdala dulcis	Dulcamara	Nux Vomica
Angelicæ Fructus	Echinacea	Papaveris Fructus
Angelicæ Radix	Ergota	Paracoto
Apocynum	Eupatorium	Pepo
Arnica	Euphorbia Pilulifera	Petroseleni Radix
Asarum	Farfara	Petroselinum
Aspidium	Ficus	Physostigma
Baptisia	Foeniculum	Pimpinella
Berberis	Fraxinus	Populi Gemmæ
Boldo	Fucus	Prunum
Bryonia	Grindelia	Pulsatilla
Capsicum	Guaiaci Lignum	Pyrethrum
Cataria	Helianthemum	Rhus Glabra
Caulophyllum	Humulus	Rosa Gallica
Centaurium	Hydrastis	Rubi Fructus
Chirata	Inula	Rubi Idæi Fructus
Chondrus	Kava	Sabal
Cimicifuga	Kola	Sambucus
Cocculus indicus	Krameria	Sanguinaria
Coffea Tosta	Leptandra	Sassafras
Colchici Cormus	Linum	Sassafras Medulla
Colchici Semen	Lobelia	Scoparius
Colocynthis	Macis	Scutellaria
Coptis	Matricaria	Senecio
Crocus	Mentha Piperita	Senega

TABLE 11 (*Continued*).—No Crystals of Calcium Oxalate or of Any Substance Resembling It Present.

Sinapis Alba	Taraxacum	Verbasci Flores
Sinapis Nigra	Thuja	Verbasci Folia
Solanum	Thymus	Verbena
Spigelia	Trillium	Zea
Staphisagria	Triticum	Zedoaria
Strophanthus	Valeriana	Zingiber
Sumbul		

SACCHARIN FEEDING OF RATS.*[1]

B. FANTUS AND L. HEKTOEN.

The importance of saccharin as a sweetening agent for medicine and in diabetes mellitus justified, it seemed to us, the undertaking of a prolonged feeding experiment.

EXPERIMENT I.

To determine the effect of prolonged ingestion of relatively enormous quantities of saccharin, parallel observations were made on 25 young rats (5 males, 20 females), in each of three good-sized cages. Group I A received 10% saccharin in its food, Group I B received 1% saccharin in food, Group I C served as control.

After preliminary trials, the following food formula was adopted: Cornmeal, 200 Gm.; White Flour, 100 Gm.; Meat, 50 Gm.; Water, 200 cc. This was given the control animals, while for the other groups the required amount of soluble saccharin (sodium benzoylsulphonicimide—Heyden Chemical Works) was added. The mixture was then molded into cakes. The only other food the animals received was a small amount of lettuce or carrots, once a week. More food was given than could be eaten, though the exact amount of food consumed was determined only at the beginning of the experiment, until the animals had attained full growth and the food consumption became fairly constant.

The collective weight of the animals in each cage was determined daily at first, and at weekly intervals later on in the experiment. From Chart 1, which gives the average weight of the animals of each group, it will be seen that the animals fed on food containing 10% saccharin did not do as well as the controls. The weight curve of the animals receiving 1% saccharin was practically equal to that of the controls up to the 24th week, when the saccharin-fed animals commenced to lag slightly behind. This difference in weight might be due to difference in food consumption, which probably explains the lower weight curve of the animals that received 10% saccharin, who did not consume as much food as the animals of the other two groups. The animals that received 1% saccharin consumed practically the same amount of food as the controls.

During the course of the experiment, animals died from time to time, practically always from acute or chronic bronchopneumonia. A few animals died from cerebral abscesses. By the end of the 36th week, 16 animals had survived in Group I A, 13 animals had survived in Group I B, and 19 animals in Group I C.

All the rats were now killed by chloroform; and it was found that all of the rats of the saccharin groups and most of the rats of the control group had more or

* From the John McCormick Institute for Infectious Diseases.

[1] Scientific Section, A. Ph. A., Cleveland meeting, 1922.

less extensive pulmonary involvement. The difference in the findings of the three groups is shown in Table 1.

TABLE 1.

Lung Involvement of Animals Killed at the End of Experiment I.

Rat No.	Group I A. 10% saccharin rats.	Group I B. 1% saccharin rats.	Group I C. controls.
1	Extensive	Extensive	None
2	Extensive	Moderate	Quite extensive
3	Small acute focus	Slight	Quite extensive
4	Extensive	No evident change	Quite extensive
5	Extensive	Very extensive chronic	None
6	Extensive	Quite extensive	Extensive
7	Small acute focus	Quite extensive	Very extensive
8	Moderate	Rather slight	Extensive
9	Extensive	Not very extensive	None
10	Moderate	Entire right lung	None
11	Extensive	Slight	None
12	Quite extensive	Moderate	Slight
13	Quite extensive	Slight tumor of left chest wall	None
14	Extensive		None
15	Moderate		Moderate
16	Moderate		Rt. lung involved
17			Slight
18			Quite extensive
19			Moderate

From this tabulation it will be seen that the controls suffered much less from the pulmonary disease than did the others, and that the 1% saccharin-fed rats showed considerably less pulmonary disease than did the rats given food containing 10% saccharin. Indeed, the difference in the amount of lung involvement was so marked that it would easily account for the difference in the weight and size of the three groups of animals at the end of the experiment. The various other organs of the animals showed no gross evidence of disease; and the kidney, liver, spleen, pancreas, and stomach of each of the rats submitted to microscopic examination did not reveal any special changes.

As the average food consumption of these animals was 11.2 Gm. for the first 6 weeks, and then rose to an average of 13.2 Gm. during the remainder of the experiment, and the total food consumption during the 252 days of the experiment approximated 3100 Gm., *each of the 10% saccharin rats consumed about 310 Gm. of saccharin during the course of the experiment; or about twice its maximal weight.* Yet, be it noted, no evidence of definite damage could be found in the kidney, liver, spleen, pancreas, and stomach on either macroscopic or microscopic study.

EXPERIMENT II.

Inasmuch as organs might undergo changes of such nature as not to be discoverable even by microscopic examination, the next experiment was planned to continue for the natural life-time of the animals. In an attempt, unfortunately unsuccessful, to protect at least some of the rats against infection, three of the seven animals of each group were kept in separate cages, while one male and three females were kept in one cage.

The animals were fed a ration, the formula for which was kindly furnished us by E. V. McCollum consisting of the following:

Sugar	140 Gm.
Whole wheat	2240 Gm.
Powdered milk	350 Gm.
Calcium carbonate	42 Gm.
Sodium chloride	28 Gm.

Enough water to make into cakes.

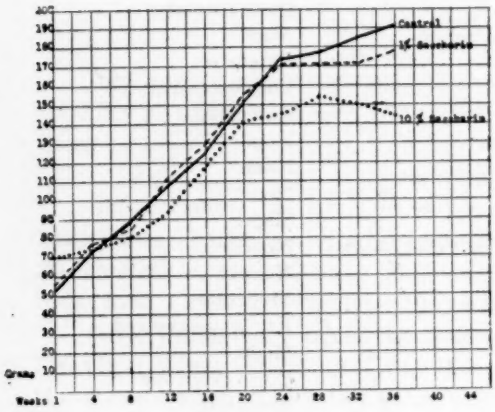

Chart 1. Experiment I.—Average weight curve of rats fed 10% saccharin (dotted line); 1% saccharin (broken line); controls (continuous line). Animals killed at end of 36th week.

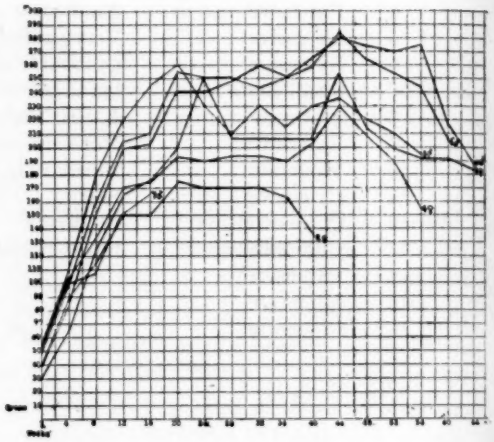

Chart 2. Experiment II.—Weight curve of individual rats given food containing 1% saccharin. Animals permitted to live until natural death occurred.

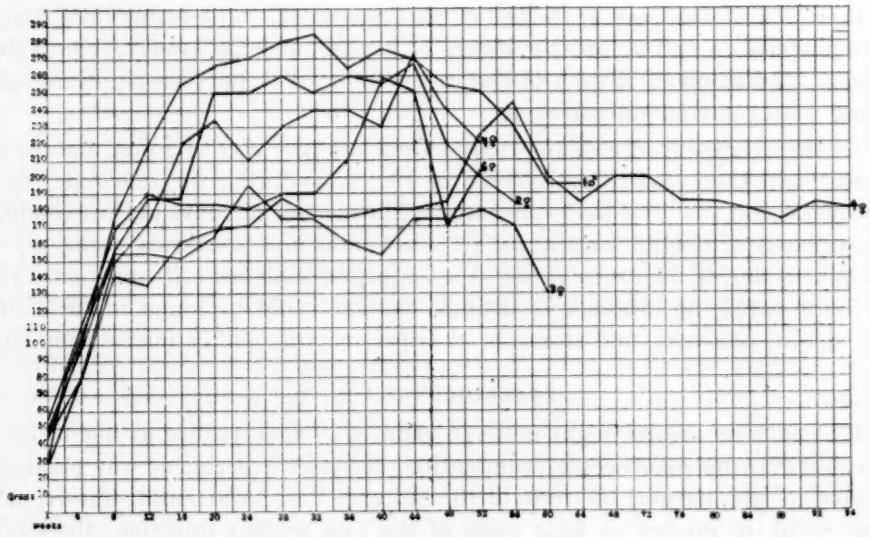

Chart 3. Experiment II.—Weight curve of individual rats given food containing 0.1% saccharin. Animals permitted to live until natural death occurred.

Group II A was fed with 1% saccharin added to the above mixture; Group II B was given 0.1% saccharin, Group II C served as control. The animals ate the saccharin food greedily and thrived as well as the control animals, as may be seen from the growth curves of the individual rats shown on Charts 2, 3, and 4.

TABLE 2.

The Necropsy Findings and Duration of Life of Rats in Experiment II.

Animal number.	Group II A. 1% saccharin. Necropsy findings.	Lived.	Group II B. 0.1% saccharin. Necropsy findings.	Lived.	Group II C. Controls. Necropsy findings.	Lived.
1	Hepatization of middle lobe of left lung	14 mo.	Chronic pneumonia	16 mo.	Infection of left middle ear	3 mo.
2	Chronic pneumonia	10 mo.	Chronic and acute pneumonia	14 mo.	Large abdominal growth, and pneumonia	16 mo.
3	Chronic pneumonia abscess of lung	16 mo.	Acute pneumonia	15 mo.	Pneumonia	14 mo.
4	Chronic and acute pneumonia	14 mo.	Negative was killed	26 mo.	Abscess in right post. fossa of skull	8 mo.
5	Pneumonia	15 mo.	Lost	...	Very extensive chronic pneumonia	11 mo.
6	Chronic pneumonia	16 mo.	Very extensive bilaterial broncho-pneumonia chronic	13 mo.	Pneumonia	17 mo.
7	Overloaded stomach, no other indications of disease	4 mo.	Old abscess of lung	13 mo.	Chronic pneumonia, abscess of lung	14 mo.
	Av.	$12^{5}/_{7}$ mo.	Av.	$16^{5}/_{7}$ mo.	Av.	$11^{6}/_{7}$ mo.

The necropsy findings and duration of life of these animals are shown in Table 2. It will be seen that the 0.1% saccharin group (II B) showed the longest average life period. This was due to one animal that lived for 26 months; and which, when finally killed, was found to be free from disease. Eliminating this animal from calculation, gives an average life period for Group II B, of $14^{1}/_{5}$ months. This is practically the same as the average life period of the animals of the control group, if we eliminate the two animals that died from infection within the skull, which greatly shortened life. It will then be seen that the average duration of the remaining animals that died of pulmonary infection was $14^{2}/_{5}$ months. In Group II A, fed on 1% saccharin, it is but fair to eliminate No. 7 which had an unusually short duration of life and died from some obscure cause. The average duration of life of the remaining animals is $14^{1}/_{6}$ months.

The conclusion is, therefore, forced upon us that saccharin, in the quantities used in this experiment, did not shorten the lives of those animals that ultimately succumbed to the pulmonary disease. The quantities of saccharin given were much in excess of those that would ever be likely to be consumed by man. Figuring on the relative weights, the quantity would approximate 3 Gm. per day for

a 60 Kg. person in the 0.1% saccharin experiment, and 30 Gm. per day in the 1% saccharin experiment.

EXPERIMENT III.

To study the question whether saccharin had any detrimental effect upon the progeny, groups of 4 of the young rats of saccharin-fed animals were continued on the same food as that given the parents, and compared with the young of control rats kept under similar conditions.

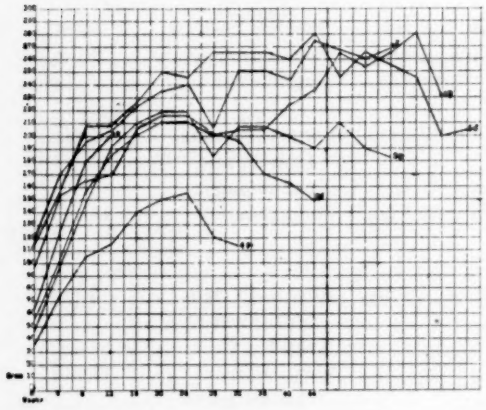

Chart 4. Experiment II.—Weight curve of individual rats serving as control. Animals permitted to live until natural death occurred.

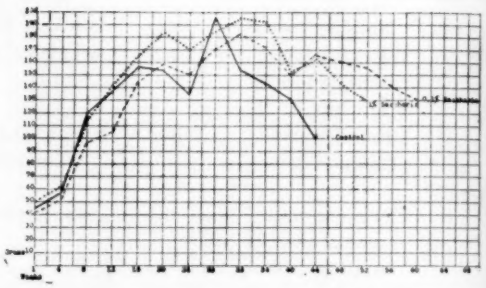

Chart 5. Experiment III.—Average weight curve of progeny of saccharin-fed rats continued on same food their parents received. Rats given 1% saccharin in food (dotted line); 0.1% saccharin (broken line); compared with that of control rats (continuous line). Animals permitted to live until natural death occurred.

Group III A, consisting of 4 young rats of one litter of a rat that had been fed 1% saccharin in its food for $7^1/_2$ months, was continued on this food for the whole life-time. The average weight of these rats (dotted line, Chart 5) became higher than that of the other animals and continued so until near the end when it dropped, obviously due to disease. All of these animals died of pneumonia. The average duration of life of these animals was 11 months (Table 3).

TABLE 3.

The Necropsy Findings and Duration of Life of Animals in Experiment III.

Animal number.	Group III A. 1% saccharin. Necropsy findings.	Lived.	Group III B. 0.1% saccharin. Necropsy findings.	Lived.	Group III C. Controls. Necropsy findings.	Lived.
1	Pneumonia	9 mo.	Pleurisy. Lung collapsed	5 mo.	Pneumonia	4 mo.
2	Pneumonia chronic-acute	11 mo.	Pneumonia	10 mo.	Necropsy lost	5 mo.
3	Pneumonia	11 mo.	Chronic pneumonia	14 mo.	Pneumonia	7 mo.
4	Extensive nodular pneumonia	13 mo.	Chronic pneumonia	15 mo.	Pneumonia	11 mo.
		Av. 11 mo.		Av. 11 mo.		Av. $6^3/_4$ mo.

Group III B was made up of four young of a rat fed 0.1% saccharin and of practically the same age as those of Group III A, having been born only a few days later. Their weight curve (broken line, Chart 5) continued a little lower than that of the animals that were fed ten times as much saccharin, except toward the end. Some of the animals lived longer; but the average duration of life was the same as that of Group III A.

In this experiment, the animals of the control group (III C) suffered more severely from pneumonia than did the saccharin-fed animals, as is shown by the progressive drop (continuous line, Chart 5) in weight commencing with the 28th week and by the fact that these animals lived an average of only $6^3/_4$ months as compared with an average of life of 11 months of the saccharin-fed animals.

DISCUSSION.

If Experiment I stood alone, the impression would be gained that the animals fed saccharin were less resistant to pneumonia than the controls; and that the diminution in resistance was in proportion to the amount of saccharin: though it must be admitted that the quantities used were so large as to render this experiment of no practical value as far as consumption of saccharin by human beings is concerned. Curiously enough, in Experiment III, the relations as to weight and duration of life are exactly the reverse. This probably shows that the incident and severity of the pneumonic involvement had nothing to do with the saccharin given; but was due to some other factor, such as possibly the location of the cages in relation to the window. It so happened that in Experiment I Cage A, the animals in which suffered most from pneumonia, was nearest to the window; while in Experiment III Cage C containing the controls, which suffered most from pneumonia, was nearest the window. This window was kept slightly open at all times, summer and winter.

While the gross figures of the average life span in Experiment II show quite a difference, decidedly unfavorable to the control animals, it would be unfair to conclude that saccharin lengthened the life-time of the animals that received it. Correcting the figures in the light of the necropsy findings gives a remarkably close correspondence of the average life period.

CONCLUSIONS.

Feeding saccharin to rats in even relatively enormous doses, and for a life-time of these animals, does not produce lesions appreciable either macroscopically or microscopically, nor does it interfere with the development of these animals or of their progeny, or shorten their span of life.

THE RESORCIN TEST FOR METHYL ALCOHOL.*

BY A. B. LYONS.

The tests most commonly used for the detection of methyl alcohol depend on the conversion into formaldehyde by oxidation of a portion at least of that compound, formaldehyde itself being easily recognized by characteristic reactions.

In case ethyl alcohol also is present the acetaldehyde which results from its oxidation may interfere with some of the distinctive tests for formaldehyde, as in the case of the very striking morphine test, where the purple color produced by formaldehyde is masked by the brown due to acetaldehyde.

The test which is the subject of this paper is not wholly free from this objection, yet fallacious conclusions from its indications are not liable to be reached. Although it has been somewhat neglected of late years, it is one of unique intrinsic interest.

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* Scientific Section, A. Ph. A., Cleveland meeting, 1922.

It will be worth while for one who is not familiar with it to make the following experiments. Put into a 500 cc measuring flask 1 cc of the official solution of formaldehyde and fill the flask to the mark with water. From this solution (1:500) prepare successive dilutions 1:1000; 1:2000; 1:4000; 1:8000.

Put into each of 5 test-tubes 1 drop of 1% solution of resorcin, add 1 cc of solution No. 1, followed by 1 cc of strong sulphuric acid. If this is added all at once, and the fluids are quickly mixed by shaking the tube, there will appear momentarily a milky clouding of the mixture, giving place almost at once to a deep red color, with separation promptly of a dark red precipitate, which being specifically lighter than the fluid rises toward the surface, leaving the solution presently nearly without color. If the solution is now diluted with two or three times it volume of water, and thrown upon a filter, it will be seen that the filtrate is quite colorless.

The red precipitate is not perceptibly soluble in either water, dilute acids, alcohol, ether, chloroform, or any similar solvent, so far as I have carried my experiments. The manner of making the test may be modified. A part only of the acid, 10 to 20 drops, from a 1 cc pipette may be added at first, producing a milkiness, with shortly a separation of a nearly white precipitate, which on addition of the remainder of the acid becomes red. Again the acid may be added in such a manner that it flows down the side of the inclined test-tube to form an underlying stratum. In this case a red precipitate will form at the plane of contact of the fluids, while if the strata are made to commingle a little by a gentle motion of rotation, a distinct milky zone will develop above the red ring, the separating floccules changing from whitish to deep red.

Test in succession in the same manner the weaker solutions, and observe the gradual increase in duration of the stage of milkiness, and the corresponding decrease in the quantity of red precipitate which finally separates. At the last there is no immediate separation at all of such precipitate, although on dilution and filtration presence of red floccules is made evident. In the course of a few hours the red particles will aggregate, forming a distinct cloud if the dilution is not greater than 1:20,000 of HCHO.

Thus far we have been studying the reactions of formaldehyde uncomplicated by the presence of the products of oxidation of ethyl alcohol. Prepare now highly dilute solutions respectively of methyl alcohol, ethyl alcohol, and a mixture of these two, and oxidize them with potassium permanganate by the method substantially of Robert M. Chapin.*

For solution (A) add 1 cc of a ten per cent. (vol.) solution of methyl alcohol, 5 cc of water, 1 cc of "dilute" phosphoric acid (one volume of the official acid diluted with water q.s. to make 5 volumes), and 2 cc of 3% aqueous solution of potassium permanganate. Let the mixture stand at room temperature 30 minutes, add 1 cc of a 10% aqueous solution of oxalic acid, and after 2 minutes, drop by drop slowly, strong sulphuric acid q.s. to decolorize. Finally add water q.s. to make 50 cc.

Solution (F) is prepared in the same manner except that in addition to the 1 cc of 10% methyl alcohol, 2 cc of a 10% solution in water of official alcohol is used, and the quantity of the permanganate solution is increased to 3 cc.

In solution (K) use in place of the methyl alcohol of (A) an equal quantity of ethyl alcohol of official strength (95%).

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* *Jour. Ind. & Eng. Chem.*, June 1921, p. 544.

From (A) prepare dilutions B, C, D and E by adding, respectively, 8, 6, 4 and 2 cc of it to water q. s. to make 10 cc. Place in each of 5 test-tubes 1 drop of 1% solution of resorcin, add to the first 1 cc of (A), to the second 1 cc of (B), and so on. Finally add to each tube 1 cc of strong sulphuric acid, shake the tubes in each case at once and note the color changes that occur in one minute and in 30 minutes. The first tube shows momentarily a milky turbidity, giving place to a dark red color, with prompt separation of a dark red precipitate. The last tube develops at first a slight milkiness, changing gradually to a pure red color, with or without the separation within the time limit of a red cloud. If the solution is diluted after cooling with twice its volume of water, and filtered, it yields a perfectly colorless filtrate.

From (F) prepare a series of dilutions corresponding with those from (A), designated respectively as G, H, I and J, and apply 1 cc of each the resorcin test. Compare the results with those of the former series.

Note that while the separation of a red precipitate occurs in much the same manner as in that series, there is a great difference in the color of the resultant solutions particularly when the quantity of methyl alcohol is small; in place of a pure red we have now shades of amber, orange or yellow. If the solutions when cold are diluted with twice their volume of water and filtered, there will remain on the filter traces at least of a red precipitate, while the filtrate will be yellowish or pale yellow.

From (K), which is practically free from formaldehyde, prepare also a series of dilutions, and apply to these the resorcin test. Neither milkiness nor a red color is produced in any of them, a clear solution of a more or less pronounced yellow color resulting in each case. In the strongest the color is an intense golden yellow, showing a strong green fluorescence. The same color, it will be remembered, is produced by Hehner's test in its several modifications, where in place of resorcin, peptone, egg albumen or milk is used, and appears also when either test is applied to oxidized solutions of acetone and other derivatives of ethyl alcohol.

Familiarity with these facts is presupposed on the part of anyone applying the resorcin test for presence of formaldehyde.

For the practical testing of a sample of spirituous liquor suspected to contain methyl alcohol the following routine procedure is proposed:

Prepare the sample if necessary by diluting with an equal volume of water and distilling slowly to obtain a distillate of the same volume. To 1 cc of this add water q. s. to make 10 cc. Measure of this diluted distillate exactly 1 cc into a small flask. Add 5 cc of water, 1 cc of "dilute" phosphoric acid (1 volume of the U. S. P. strong acid diluted with water to make 5 volumes) and 3 cc of a 3% aqueous solution of potassium permanganate. Let this mixture stand at room temperature 30 minutes, then add 1 cc of a 10% aqueous solution of oxalic acid. After 2 minutes add from a 1 cc pipette 5 drops of strong sulphuric acid, and after 1 minute 5 drops more, continuing this until the color of the solution is discharged. Add then water q. s. to make 50 cc. Label the solution (X).

Prepare a standard oxidized solution (A), using 1 cc of a 10% volume solution of pure methyl alcohol, 2 cc of 10% ethyl alcohol, 1 cc of "dilute" phosphoric acid, and 3 cc of 3% potassium permanganate, following the same routine as above and making up the solution to 50 cc.

From this standard solution prepare dilutions (B), (C), (D) and (E) by adding to 8, 6, 4 and 2 cc of it water q. s. to make 10 cc. Place in each of 5 test-tubes 1

drop of a 1% solution of resorcin, in the first 1 cc of (A), in the second 1 cc of (B), and so on; finally add to each 1 cc of strong sulphuric acid. Label respectively: Color Standard, 100% (or 10%); Color Standard, 80% (or 8%); Color Standard, 60% (or 6%); Color Standard, 40% (or 4%); and Color Standard, 20% (or 2%).

Prepare now for comparison a color solution of the sample by adding to 1 cc of (X), 1 drop of the resorcin solution, and 1 cc of strong sulphuric acid. Compare the results with those of the color standard series. If there is exact correspondence with one of these the per cent. of methyl alcohol in the sample will be that stated on the label (the first figure).

When coincidence is not exact in any case, make an interpolation by methods familiar in colorimetry and so arrive at a close approximation to the correct percentage. (Note that the "color" in this connection is used in a broad sense, including all the observed phenomena of the reactions.)

When the indicated percentage is less than 20, modify the procedure by taking 5 instead of 1 cc of the diluted distillate to prepare our oxidized solution, omitting the 5 cc of water and making up the volume to 25 instead of 50 cc. It will be seen that the indicated percentages will be just one-tenth of those given in the first figures on the color standard labels—the figures therefore in parenthesis on those labels.

If the percentage is above 20 resort to interpolation to obtain reasonably correct figures. It will not often happen in the examination of a distilled spirit (*e. g.*, whisky) that the per cent. will be much above 40.

In case no ethyl alcohol is present, indicated by absence of yellow color in results of tests of highly dilute solutions, modify the procedure by omitting ethyl alcohol in preparing the standard oxidized solutions, and use for the oxidation only 2 instead of 3 cc of the permanganate solution.

It is to be understood that the quantitative results arrived at in these tests are necessarily only approximate, for the reasons that oxidation of wood spirit by the method employed is not strictly quantitative, and that the tests made under conditions as nearly as possible identical show capricious variations, particularly as to rapidity of precipitation.

Further, we are to remember that methyl esters and some other compounds, including some of the higher alcohols, may yield formaldehyde by oxidation. It is safe to say, however, that a wholly negative result is conclusive as to the practical absence of methyl alcohol.

Whether useful results can be reached by isolating and weighing the precipitate is an interesting question, the investigation of which I have not yet attempted.

Comparisons of results may be made roughly in case the precipitates are copious by noting the effect of dilution, using as a criterion the separation or non-separation of floccules within 30 minutes, but slight differences in the conditions present influence the results to such a degree that the margin of uncertainty is very wide. Collection of the floccules on a filter, when the solutions are very dilute, may enable a practiced eye to judge of the relative quantity of such precipitates.

Results by the latter mode of comparison may be checked by one in which the quantity of acid used in the test is reduced until only a milkiness is produced instead of a distinct reddish or red precipitate.

A baffling problem is that of determining with reasonable exactness the proportions of methyl and ethyl alcohol when in simple mixture. Complete oxidation

requires a much greater quantity of oxygen in the former case than the latter, and a simple combustion method should not be difficult to devise.

The resorcin test, however, is capable of giving results of practical value and it need not consume much time. Standard solutions may be prepared containing respectively 20, 40, 60 and 80 per cent. by volume of methyl alcohol, the remainder consisting of 95% ethyl alcohol. Five cc of each of these solutions is to be diluted with water to make, after cooling, 25 cc.

To 1 cc of each of these dilutions is added 5 cc of water, 1 cc of "dilute" phosphoric acid, and 2 cc of potassium permanganate solution (3%). The further routine given already in detail for producing an "oxidized" solution is to be carried out, and thus standard color solutions obtained with which to compare similar solutions prepared from the sample under examination.

PRACTICAL CONCLUSIONS.

The resorcin test for methyl alcohol in spirituous liquors is easily made. The reactions involved are strikingly characteristic and not more subject to misinterpretation than other similar tests depending upon the oxidation of methyl alcohol to formaldehyde.

Ethyl alcohol influences the result of the test, but rarely so as to invalidate the conclusions drawn therefrom.

In case of mixtures pure and simple of methyl and ethyl alcohols it is practicable to determine approximately the proportions of each. This is true even when water also is present.

LABORATORY NELSON, BAKER & CO.,
July 3, 1922.

THE ANTIDOTAL EFFICACY OF FERRI HYDROXIDUM CUM MAGNESII OXIDO, U. S. P. IN ARSENICAL POISONING.

BY HUGH McGUIGAN, H. V. ATKINSON AND G. A. BROUGH.

INTRODUCTION.

This investigation was undertaken at the request of the U. S. Pharmacopœial Revision Committee, through Dr. Torald Sollmann. The Committee is interested in the antidotal efficacy of Ferri Hydroxidum cum Magnesii Oxido, U. S. P. in arsenical poisoning.

Bunsen and Berthold,[1] in 1834, recommended the use of freshly precipitated ferric hydroxide in the treatment of acute arsenical poisoning. This work has been the basis for treatment ever since. De Busscher,[2] in 1902, after an investigation of the problem, claimed the antidote was without beneficial effect.

In some cases his animals, even without antidote, survived for several months and therefore can hardly be called acute cases. In addition, laboratory animals may die from other causes when they are kept in cages this length of time. Before giving the arsenic, he did not attempt to have their stomachs practically free from food. All of these factors might be raised to render the interpretation of his results uncertain. Therefore, we have thought it advisable to reinvestigate the essential parts of his work before rejecting this standard treatment. It is not necessary to determine the smallest lethal dose; this has already been adequately done by de Busscher,[2] Morishima,[3] and also by Schwartze.[4] However, to test a treatment, we should know that a dose of arsenic sufficient to cause death has been given. Then, if the antidote is useful, we can evaluate it. We have, therefore,

used a dose of arsenic which in the majority of cases, if untreated, would be fatal. This, in practice, is the only kind of case that requires an antidote. Schwartze[4] has shown that the finer the particles of As_2O_3 the greater the toxicity, and he comments on the great variability of the results of a given dose. Since in our work the same preparation of arsenic trioxide was used throughout, it was thought unnecessary to measure the fineness of the particles. In the administration of the same sample however, owing to agglomeration, it is difficult to get exactly uniform conditions when the solid preparation is used.

Rabbits were used in the first series of experiments. These animals were used in order to check previous workers and also because they, like other rodents, cannot vomit the drug or antidote; hence this complicating factor is avoided. There are some objections, however, to the use of rabbits. Food remains in the stomachs of rabbits for a long time and it is difficult to introduce either drug or antidote unless they are fasted for several days. The food itself has some protective value; but if they are starved until the stomach is empty, the starvation itself may be a contributory factor in the causation of death. The quantity of food in the stomach should be materially reduced before giving either arsenic or antidote, and for this reason the rabbits were fasted for three days and the dogs for two days before being used. Careful post mortems were performed in each case to exclude deaths from faulty technique.

Vomiting always occurs in the dog after arsenic if not prevented. De Busscher found, and we corroborate his conclusion, that vomiting is the most effective mechanism. Apparently more of the poison was removed in this way than by washing out the stomach. Vomiting can be delayed, and in some cases prevented, by depressing the vomiting center with morphine.

For many reasons dogs are the most satisfactory animals for this work, therefore, many of them were used.

Liquor Potassii Arsenitis, U. S. P. (Fowler's Solution), made from Merck's Arsenic Trioxide, U. S. P., and the solid arsenic trioxide were the preparations of arsenic used. It was found necessary to use a dose of Fowler's Solution equivalent to at least 20 mg. of As_2O_3 per kilogram of body weight, and 100 mg. of the solid As_2O_3, in order to cause death in a reasonable length of time. Owing to the small dose required for rabbits, Fowler's Solution was diluted four times in these experiments. This was introduced through a stomach tube into the rabbits and the residue washed in with a small additional volume of water. The arsenic solution was used undiluted in the dog experiments.

The proper dose of solid arsenic trioxide was weighed into small beakers in advance and when all doses were ready the dogs were given a hypodermic injection of one-fourth grain of morphine sulphate. The vomiting mechanism was sufficiently depressed in about one-half hour. A total of about 50 cc of water was then added to the beaker in several successive portions, the material stirred and the suspended particles poured through a stomach tube. The antidote, Ferri Hydroxidum cum Magnesii Oxido, U. S. P., when used, was administered immediately through the same stomach tube and the animals placed in cages for observation.

EXPERIMENTAL DATA.

Table I gives the duration of life of rabbits poisoned with a volume of Fowler's Solution equivalent to 20 mg. of As_2O_3 per kilogram of body weight. No antidote was used in this series.

Table II gives the duration of life of rabbits treated as in Table I and then given 50 cc of antidote.

Tables III and IV give the effect of the antidote alone on rabbits and dogs. These animals were not given arsenic.

Table V gives the duration of life of dogs which were first given one-fourth grain of morphine sulphate to prevent vomiting and then Fowler's Solution equivalent to 25 milligrams of AS_2O_3 per kilogram of body weight. No antidote was given to these dogs.

Table VI gives the results on dogs treated as in Table V and then given antidote.

Table VII gives the results on dogs treated as in Table V except the dose of Fowler's Solution was reduced to 20 mg. As_2O_3 per kilogram of body weight. No antidote was given.

Table VIII gives the results on dogs treated as in Table VII except 100 cc of antidote was administered immediately after the Fowler's Solution.

Table IX gives the results obtained by administering 100 mg. of solid As_2O_3 per kilogram of body weight to dogs after they had been depressed with morphine sulphate.

Table X gives the results obtained under identical conditions as in Table IX, except 100 cc of antidote was administered immediately after the arsenic trioxide.

Table XI gives the results obtained after the administration of 100 mg. of solid As_2O_3 per Kg. of body weight when a larger volume of antidote was used. In this series, to reduce the volume, the arsenic was washed into the stomach by the antidote.

TABLE I.

DURATION OF LIFE OF RABBITS POISONED WITH FOWLER'S SOLUTION.

Number of rabbit.	Weight, Kg.	Dose of As_2O_3, Mg.	Hours until death.
1	0.84	21	60
2	1.16	29	18
3	1.31	33	29
4	1.16	29	38
5	1.30	32	18
6	1.58	39	38
7	2.46	61	17
8	2.53	63	15
9	2.29	57	26
10	2.37	59	16
11	2.17	54	10
12	2.69	67	27
			Average 26.1

TABLE II.

DURATION OF LIFE OF RABBITS POISONED WITH FOWLER'S SOLUTION FOLLOWED IMMEDIATELY WITH 50 CC OF ANTIDOTE.

Number of rabbit.	Weight, Kg.	Dose of As_2O_3, Mg.	Hours until death.
13	1.62	40	31
14	1.64	41	30
15	1.00	25	39
16	2.73	68	15
17	1.52	38	63
18	1.79	45	18
19	1.62	40	18
20	1.35	34	100+
21	1.49	37	30
22	1.14	28	63
23	1.80	45	18
24	1.76	44	49
25	1.81	45	48
26	1.82	45	46
27	1.69	42	45
28	2.69	67	16
29	2.37	59	10
30	1.72	43	49
			Average 34.6

TABLE III.

EFFECT OF ANTIDOTE ALONE ON RABBITS.

Number of rabbit.	Weight, Kg.	Antidote cc.	Hours until death.
31	1.70	100	Survived
32	1.40	100	Survived
33	1.69	50	Survived
34	1.24	50	Survived
35	1.37	50	Survived
36	1.46	50	Survived
37	3.45	50	Survived

TABLE IV.

EFFECT OF ANTIDOTE ALONE ON DOGS.

Number of dog.	Weight, Kg.	Antidote cc.	Hours until death.
1	7.5	100	Survived
2	5.5	75	Survived
3	6.5	75	Survived
4	20.0	100	Survived
5	17.5	100	Survived
6	12.8	100	Survived

TABLE V.

DURATION OF LIFE OF DOGS POISONED WITH FOWLER'S SOLUTION.

Number of dog.	Weight, Kg.	Dose cc.	Hours until death.
7	6.4	16.0	14
8	5.6	13.5	6
9	20.0	50.0	4
10	6.4	16.0	4
11	6.4	16.0	9
		Average,	7.4

TABLE VI.

DURATION OF LIFE OF DOGS POISONED WITH FOWLER'S SOLUTION AND GIVEN ANTIDOTE IMMEDIATELY.

Number of dog.	Weight, Kg.	Dose cc.	Antidote cc.	Hours until death.
12	7.6	19.0	100	33
13	8.4	21.0	100	18
14	15.2	38.0	75	10
15	3.2	8.0	75	12
16	6.0	15.0	75	10
			Average,	16.6

TABLE VII.

DURATION OF LIFE OF DOGS POISONED WITH FOWLER'S SOLUTION.

Number of dog.	Weight, Kg.	Dose cc.	Hours until death
17	11.0	22.0	11
18	14.4	28.8	10
19	11.3	22.6	7
		Average,	9.3

TABLE VIII.

DURATION OF LIFE OF DOGS POISONED WITH FOWLER'S SOLUTION AND GIVEN ANTIDOTE IMMEDIATELY.

Number of dog.	Weight, Kg.	Dose cc.	Hours until death.
20	9.0	18.0	384*
21	15.7	31.4	Survived
22	14.4	28.8	20
23	15.8	31.6	12
24	7.7	15.4	10
		Average,	14

* This dog was not in good physical condition at the start, but showed marked improvement after receiving the antidote.

TABLE IX.

EFFECT OF SOLID As_2O_3 ON THE DURATION OF THE LIFE OF DOGS.

Number of dog.	Weight, Kg.	Dose of As_2O_3, Gm.	Hours until death.
25	4.5	0.45	Survived
26	6.4	0.64	14
27	9.1	0.91	15
28	9.3	0.93	13
29	8.2	0.82	16
30	5.9	0.59	23
31	16.4	1.64	Survived
32	6.4	0.64	19
33	11.8	1.18	16
34	10.0	1.00	18
35	6.9	0.69	Survived
36	7.0	0.70	18
37	5.7	0.57	25
38	9.8	0.98	17
39	7.4	0.74	16
40	8.6	0.86	Survived
41	6.6	0.66	17
42	5.0	0.50	34
43	10.0	1.00	66
44	5.7	0.57	Survived
45	12.3	1.23	34
46	11.1	1.11	37
47	9.1	0.91	33
			Average, 24.0

TABLE X.

EFFECT OF SOLID As_2O_3 FOLLOWED BY 100 CC. ANTIDOTE ON THE DURATION OF LIFE OF DOGS.

Number of dog.	Weight, Kg.	Dose of As_2O_3, Gm.	Hours until death.
48	8.4	0.84	40
49	14.5	1.45	40
50	11.3	1.13	Survived
51	6.4	0.64	25
52	8.6	0.86	Survived
53	5.9	0.59	31

Number of dog.	Weight, Kg.	Dose of As_2O_3, Gm.	Hours until death.	Number of dog.	Weight, Kg.	Dose of As_2O_3, Gm.	Hours until death
54	5.9	0.59	Survived	59	4.1	0.41	17
55	14.1	1.41	23	60	4.8	0.48	30
56	9.9	0.99	16	61	8.4	0.84	12
57	11.4	1.14	Survived	62	7.7	0.77	24
58	6.4	0.64	13				Average, 24.4

TABLE XI.

EFFECT OF SOLID As_2O_3 FOLLOWED BY ANTIDOTE ON THE DURATION OF LIFE OF DOGS.

Number of dog.	Weight, Kg.	Dose of As_2O_3, Gm.	Volume of antidote cc.	Hours until death.
71	7.7	.770	300	Survived
72	3.9	.390	200	17 days
73	10.5	1.050	375	214
74	5.0	.500	375	23
75	5.0	.500	250	197
76	9.5	.950	375	Survived
77	5.5	.550	375	71
78	6.8	.680	250	Survived
79	15.5	1.550	400	Survived
80	8.2	.820	250	23
81	12.3	1.230	350	17 days
82	5.9	.590	No antidote	17 days
83	5.9	.590	No antidote	119
84	4.9	.490	250	Survived
85	9.0	.900	250	74
86	5.9	.590	No antidote	23
87	5.0	.500	200	142
88	10.0	1.000	250	118
89	8.6	.860	No antidote	23

TABLE XII.

RECAPITULATION OF DATA.

	As_2O_3 per kilo mg.	Duration of life without antidote hours.	Duration of life with antidote hours.	Prolongation of life. Per cent.
Tables I and II. Rabbits....	20 (as Fowler's Solution)	26.1	34.6	32.6
Tables III and IV. Rabbits and dogs.....	0 (as Fowler's Solution)	Survived	..	..
Tables V and VI. Dogs.....	25 (as Fowler's Solution)	7.4	16.6	124.0
Tables VII and VIII. Dogs..	20 (as Fowler's Solution)	9.3	14.0	50.5
Tables IX and X. Dogs.....	100 (Powdered As_2O_3)	24.0	24.4	1.7
Table XI. Dogs.....	100 (Powdered As_2O_3)	55.0	95.7	74.0

DISCUSSION—RESULTS AND CONCLUSIONS.

The work of Bunsen and Berthold was not available, hence we cannot evaluate in detail their experiments. This however, and other literature was quoted in the work of de Busscher. De Busscher's conclusions were, that the arsenic antidote is harmful in the case of poisoning by arsenic trioxide and its efficacy is temporary only with Fowler's Solution. Our work in the main is confirmatory of that of de Busscher, that is, we found the antidote of no practical value. However, we have not found as de Busscher did, that the antidote hastens death when the solid As_2O_3 is used, neither do we find it of temporary value in case of poisoning by Fowler's Solution, but rather that the antidote is without a significant influence in

either case. We feel that the average of de Busscher's work and our own would probably be more nearly correct, that is, that the antidote is without influence on the end result of the action of the arsenic. The delay of death in some cases could be attributed to the colloidal nature of the antidote and not to any specificity of the substance.

In the case of animals which we have marked "survived" we mean that they were alive at the end of two weeks. This time was an arbitrary period taken because of the great variability in the toxicity of the arsenic as pointed out by de Busscher, Schwartze and others who have investigated the subject. The same dose may kill in a few hours, or only after months. This is especially true of the solid As_2O_3. We have found that those animals which survive two weeks may survive much longer, and by taking two weeks as a limit of observation we do not think there would be any definite change in conclusions had we carried the observations over a longer period. This is especially true since the ratio of treated to untreated animals remains about the same at this time. This is obvious from the prolonged and careful observation of de Busscher.

The objection may be raised that we did not use a sufficient quantity of the antidote. The amount we did use did not modify the course of the action or the end result. Also the volume of the official preparation is too great to permit the use of much greater quantities. In the last experiment quantities as high as 375 cc were used and again we found that the individual results were of such variance that there was but little difference between the number of deaths of those given antidote and of those without it. In both cases there were marked discrepancies in the results. Again the antidote of the Belgian Pharmacopoeia is much stronger in iron than our own, and de Busscher's work answers this part of the objection. Our own work therefore, is, in general corroborative of that of de Busscher. The only change produced by the antidote is an unimportant delay in the average time of death, due, we think, to the nature of the antidote which delays absorption rather than to chemical neutralization of the arsenious trioxide.

CONCLUSIONS.

(1) Ferri Hydroxidum cum Magnesii Oxido is of no practical value in the treatment of arsenical poisoning. It has no influence in the course of poisoning by Fowler's solution.

(2) There is a slight delay in the time of death, when powdered As_2O_3 is used. This delay seems due to the colloidal nature of the antidote, and the effect on absorption, rather than to chemical neutralization.

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RATE OF VOLATILITY OF CHLOROFORM FROM CHLOROFORM LINIMENT.*

BY J. W. E. HARRISSON.

The usual smile and cheerful attitude of the pharmacist is sadly missing when he is taken to task by the State Board of Pharmacy for dispensing preparations of sub-standard strength; nor does he feel any more pleased when he learns that the deficiency of chloroform in his chloroform liniment was the betraying sin. In his own mind he perceives an injustice on the part of the State Board in selecting as a test sample a preparation with such a highly volatile constituent. In many cases he will protest along this line. Others unthinkingly will advance the excuse that the preparation was of standard strength when made and they are at a loss to know why it should be below standard. A few try to place the responsibility on the manufacturer, if they have purchased the preparation.

Excuses along these lines are of little avail, but the persistent idea of unfairness led the writer to prepare a series of samples to determine the actual responsibility.

A quantity of chloroform liniment was made and bottled under various conditions in May 1922, and assayed after a period of three months—on August 10th.

Two methods of determining the chloroform were employed; the distillation method was carried out as follows:

Method 1.—Five mils of dilute sulphuric acid and twenty mils of water were placed in a small Erlenmeyer flask. Ten mils of the liniment were then pipetted into the flask keeping the tip below the surface of the acid mixture. The flask was connected with a small straight tube condenser and the chloroform distilled over slowly; stopping when the distillate began to become cloudy when collected.

The distillate was collected in what is known as a casein tube. This is similar to a small round bottle, the lower portion of which is slightly constricted and graduated in mils and tenth mils. After distillation was complete the tube was filled with water, stoppered and vigorously shaken and then centrifuged for five minutes. The resulting volume in mils of chloroform was then read off and the per cent. volume in the original calculated.

While this method was comparatively simple and rapid in many cases it required three and four determinations before check results could be obtained.

Another method was devised which proved to be as accurate as the first and having the added advantage that it was rarely necessary to repeat the estimation.

Method 2.—Ten mils of the liniment were pipetted directly into a casein tube and the tube filled with water, stoppered and vigorously shaken. One mil of a twenty-five per cent. sulphuric acid solution was then added, the tube again shaken and then centrifuged for six minutes. Of course, practically all of the camphor was carried down with the chloroform and also the liberated insoluble fatty acids from the soap. The total volume of these was read off and then a correction factor applied for the dissolved camphor and fatty acids.

Tabulated results of the examination of two lots of liniment under various conditions and time periods follow:

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* Read before Section on Practical Pharmacy and Dispensing, A. Ph. A., Cleveland meeting, 1922.

LOT ONE.—ASSAYED MAY 8TH AND AUGUST 10TH.

	Anhydrous soap.	Camphor.	Chloroform Method 1.	Chloroform Method 2.	Correction figure.	Chloroform.
Original assay	3.34%	3.15%	29.00%	35.00%	5.9%	29.10%

	At room temperature daylight.		Room temperature dark.		Dark cool.	
	Chloroform Method 2.	Corrected.	Chloroform Method 2.	Corrected.	Chloroform Method 2.	Corrected.
Cork stoppered half full	31.20	25.30	33.20	27.30	....	....
Glass stoppered half full	31.20	25.30	33.00	27.10	....	....
Glass stoppered brown half full	31.20	25.30	32.50	26.60	....	....
Cork stoppered full	32.50	26.60	32.50	26.60	33.80	27.90
Glass stoppered full	31.80	25.90	32.70	26.80	33.20	27.30

LOT TWO.

	Anhydrous soap.	Camphor.	Chloroform Method 1.	Chloroform Method 2.	Correction figure.	Corrected per cent.
Original assay	3.725%	3.15%	30.00%	36.40%	6.20%	30.20%

	Glass stoppered, two ounce.			Cork stoppered.			Cork stoppered, foiled.		
Days.	Method 1.	Method 2.	Corrected. %	No. 1.	No. 2.	Corrected. %	No. 1.	No. 2.	Corrected %
2	28.50% 29.70	35.80%	29.60%	30.00%	35.90%	29.70%	30.50%	36.60%	30.40%
4	29.50	35.00	28.80	28.00 28.50	34.60	28.40	29.80	35.40	29.20
6	29.80	35.50	29.30	27.00	35.50	29.30	....	35.00	28.80
8	....	35.20	29.00	....	35 00	28.8	....	35.30	29.10
10	....	35.10	28.90	....	34.80	28.60	....	35.20	29.00

Anhydrous Soap was estimated by pipetting ten mils into a flat-bottom dish, with sand and drying at 110° C. until practically constant weight was obtained.

Camphor was determined by the use of the polariscope—a standard chloroform liniment reading +17.3° on the sugar scale.

The correction figure for Method 2 was arrived at in the following manner: Camphor having a specific gravity of 0.99, every gram of it occupied practically the same space as one mil of water; this also proved to be true when it was dissolved in chloroform. Therefore, every gram of camphor present would occupy practically the same volume in mils when dissolved in the chloroform. Allowance was made for the insoluble fatty acids that are liberated by taking into consideration their average combining power with Na_2O, and their average specific gravity. It was found that for every gram of anhydrous soap present there were liberated insoluble fatty acids which occupied a volume of 0.813 mil.

As an illustration we might take Lot Two—this contained 3.15% camphor which would occupy a total volume of 3.15 mils of the observed chloroformic layer. It also contained 3.725% anhydrous soap which would liberate fatty acids occupying a volume of 3.02 mils of the observed chloroformic layer or a total of 6.17 mils of the total observed chloroformic layer; by deduction we obtain the actual amount of chloroform.

While this method is not theoretically correct, there probably being some dissolved camphor and chloroform in the aqueous-alcoholic layer and *vice versa*, the practical application seems to be correct.

CONCLUSIONS.

Only slight decrease was noted in the chloroform content of chloroform liniment over a ten-day period and even on the three-month period, under conditions of extreme temperature, a maximum loss of only 3.8% was noted; also, quite contrary to expectations, there was no appreciable difference between the stability in glass- and cork-stoppered containers.

It seems, therefore, that the charge of unfairness in selecting such a sample as a test sample is not borne out. First, such a preparation would not normally be kept on the shelves of the average pharmacy for a period of three months. Second, if there is but little call for it the desired quantity can easily be prepared in a few moments.

It seems, therefore, that observed variations of five, and, in some cases ten per cent., cannot be justifiably excused.

LABORATORY OF
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SOME PHYSICAL AND CHEMICAL PROPERTIES OF NEOROBIN.*

BY PETER MASUCCI AND GEORGE A. SLOTHOWER.

I. INTRODUCTION.

Schamberg and Raiziss,[1] of the Dermatological Institute, Philadelphia, have introduced a new remedy in the treatment of psoriasis, pityriasis capitis, and some other forms of skin eruption, to which they have given the name Neorobin. Neorobin is a derivative of Chrysarobin and is made by dissolving the latter in glacial acetic acid and subsequent reduction with metallic tin.

Chrysarobin has been used quite extensively in the local treatment of psoriasis. On account of its marked staining properties, Schamberg and Raiziss have developed Neorobin which does not stain as markedly as Chrysarobin, and is more active as a reducing agent. Since Neorobin is gradually oxidized on exposure to the air, it is marketed in the form of a powder in tubes, flame-sealed under vacuum. When ready for use the powder is made up into an ointment which is then applied to the skin.

The purpose of this investigation was to devise physical and chemical tests for Neorobin which would differentiate it from Chrysarobin. It is needless to state that synthetic remedies or pharmaceuticals should be standardized or scientifically controlled whenever possible. This insures "therapeutic efficiency" and serves as a confirmatory identity test for the product. It is true that tentative assay methods of plant products and principles are often only approximate but are undoubtedly superior to empirical facts.

Most dermatologists attribute the therapeutic value of Chrysarobin in skin diseases to its reducing properties. As Neorobin has proved to be more active clinically than Chrysarobin, we have attempted to determine the relative reducing

* Read before Philadelphia Branch, A. Ph. A., February meeting, 1922.

power of the two and thus correlate this reducing action with therapeutic efficiency. A quantitative measure of the reducing power serves, therefore, not only to differentiate Chrysarobin from Neorobin but also as a means of standardizing different lots of Neorobin.

II. PHYSICAL PROPERTIES.

Neorobin is a yellow or yellowish gray powder. According to Schamberg and Raiziss it melts at approximately 190° C. They also state that it is slightly soluble in ether and methyl alcohol, and more soluble in glacial acetic acid, chloroform, benzene, and ethyl alcohol. In addition to these solvents, acetone was found to dissolve Neorobin and Chrysarobin quite readily. The former produces a golden yellow and the latter a dark red solution. No quantitative solubility tests were made with this solvent, but it was found that Chrysarobin yields 0.002 Gm. and Neorobin 0.004 Gm. of insoluble matter per gram sample. About one-quarter of the insoluble matter in Neorobin is silica.

The ash standard for Chrysarobin is 0.25%. The average percentage of ash in Neorobin has been found to be 0.6%.

Both Neorobin and Chrysarobin give a residue on subliming but the microscopical examination shows no distinguishing structure. Crystallization of Neorobin from glacial acetic acid, benzol, alcohol, xylol, benzene, and methyl alcohol was tried but with little success. A 0.1% solution of Neorobin or Chrysarobin in acetone gives crystals which have a tendency to change to the compound form. Neorobin crystallizes under certain conditions in chain formation. Sheath-like crystals are also seen. Chrysarobin forms crystals much more slowly which are relatively larger and darker in color. Compound crystals are not nearly so prevalent.

III. CHEMICAL PROPERTIES.

Neorobin is very slightly soluble in water. An aqueous suspension is neutral to litmus. Fixed alkalies dissolve Neorobin forming a deep red-colored solution. When boiled with sodium carbonate a deep red solution is also formed. Fuming nitric acid produces a red mixture which turns violet-red on the addition of ammonium hydroxide.

The method of preparation of Neorobin suggested the possibility that the substance was a complex acetate. Three gram samples of Neorobin were suspended in water to which was added phosphoric acid and silver sulphate, and the whole distilled. The distillate was negative for acetates with the sulphuric acid and ferric chloride test. Titration with alkali showed a negligible trace of some volatile acid. An analysis of the ash of Neorobin showed no tin present. These tests show that Neorobin is primarily a reduction product of Chrysarobin and is neither a compound of tin nor an acetate.

The known reducing action of Chrysarobin and Neorobin suggested a possible quantitative measure of this property. After considerable thought, acetone was chosen as the best solvent for this purpose. The color of the acetone solution and the formation of colored compounds eliminated some possible methods. The method finally adopted consisted in adding ammoniacal silver nitrate in excess to an acetone solution of the substance, whereby the silver nitrate was reduced to metallic silver and the latter determined quantitatively. This method was used to advantage by Smith[2] in the estimation of sodium hyposulphite.

IV. PROCEDURE FOR DETERMINING THE REDUCING POWER OF NEOROBIN AND CHRYSAROBIN.

(*a*) *Reagents.*—(1) Freshly prepared ammoniacal silver nitrate solution.

$AgNO_3$ C. P.	3 Gm.
NH_4OH (10%)	10 cc
Dist. H_2O	120 cc

(2) Ammoniacal solution of ammonium nitrate.

NH_4NO_3 C. P.	15 Gm.
NH_4OH (10%)	10 cc
Dist. H_2O	300 cc

(3) Acetone C. P. The acetone must pass all the tests given in the U. S. P. and in Merck's "Chemical Reagents and Their Purity Tests," 2nd Edition.

(*b*) *Procedure.*—Weigh accurately 0.1 Gm. of Neorobin or Chrysarobin. Place in a large beaker and add 50 cc of acetone. As soon as the substance dissolves add 10 cc of the ammoniacal silver nitrate solution. Allow to stand two hours until the Neorobin or Chrysarobin is completely oxidized. The precipitated metallic silver is then filtered on a Gooch crucible. An excess of asbestos interferes with the washing and filtration of the precipitate and must be avoided. The precipitate and beaker are washed repeatedly with ammoniacal ammonium nitrate solution until free from silver salts. The ammoniacal ammonium nitrate solution is used to retain the finely divided silver on the Gooch. About 150 cc is used to wash the precipitate free from silver nitrate. The Gooch is placed in the same beaker in which the reaction took place and the silver dissolved with 10 cc of nitric acid. An excess of nitric acid should be avoided as it interferes with the Volhard titration. Enough distilled water is added to cover the crucible and the whole boiled for about twenty minutes to insure complete solution of the silver and to remove any nitrous acid formed. After cooling remove the Gooch and filter the solution through filter paper. Wash with distilled water until the filtrate gives a negative test for nitrates with diphenylamine. The final volume is about 350–400 cc. The solution is yellow but it does not interfere with the Volhard titration. Ferric alum T. S. (1 cc) is used as the indicator and the solution is titrated with 0.1 *N* KCNS. As the KCNS is added the precipitated AgCNS turns the solution a milky white and as the end-point is reached the AgCNS coagulates. The end of the reaction is taken when the solution assumes a reddish brown color by transmitted light and pink by reflected light. When C. P. chemicals are used in this assay, a blank determination has been found to be unnecessary.

EXPERIMENTAL DATA.

TABLE 1.

Grains of Silver Reduced by 0.1 Gm. Sample of Neorobin or Chrysarobin.

Neorobin.		Ag.	Chrysarobin.		Ag.
Lot	1	0.1337	Lot	1	0.0819
	2	0.1370		2	0.0798
	3	0.1262		3	0.0809
	4	0.1337		4	0.0830
	5	0.1348		5	0.0863
Average		0.1330	Average		0.0823

The samples of Neorobin used in this test were actually taken at random from five distinct commercial lots. The samples of Chrysarobin came for various sources. They are, therefore, fairly representative samples.

The results of Table 1 show quite clearly that Neorobin reduces at least 50% more ammoniacal silver nitrate than Chrysarobin. This increased reducing power of Neorobin may be theoretically accounted for if we consider the chemistry of Chrysarobin. As ordinarily prepared Chrysarobin contains varying amounts of chrysophanic acid. In an alkaline solution, Chrysarobin is easily oxidized to chrysophanic acid due to the absorption of oxygen from the air. Liebermann has shown that Chrysarobin has the chemical structure of a reduced quinone, whereas chrysophanic acid is a dioxy-methylanthraquinone. Therefore, the power of Chrysarobin to absorb oxygen is due to the presence of the reduced quinone group which is oxidized to chrysophanic acid.

Neorobin is a reduction product of Chrysarobin. It is quite probable that the chrysophanic acid naturally present in Chrysarobin is reduced, thus increasing the reducing power of the substance as a whole. In other words, the greater reducing action of Neorobin is due to the presence of a quinone which has been partly produced by the reduction of chrysophanic acid in Chrysarobin. In our opinion this explains the greater affinity of Neorobin for oxygen.

V. CONCLUSIONS AND SUMMARY.

Neorobin dissolves readily in acetone producing a golden yellow solution. Chrysarobin also dissolves easily in the same solvent but forms a dark red solution. This difference in color in acetone is important as this fact can be utilized as a simple differentiating and identity test for Neorobin and Chrysarobin.

Neorobin is primarily a reduction product of Chrysarobin and is neither a tin compound nor a complex acetate.

Using the reduction of ammoniacal silver nitrate as a criteria of reducing power, Neorobin is at least 50% more active as a reducing agent than Chrysarobin.

If, as is generally admitted, the therapeutic action of Chrysarobin is primarily due to its reducing action, then Neorobin should be at least 50% more active therapeutically.

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LEECHES—HOW TO DISPENSE THEM.*

BY OTTO RAUBENHEIMER.

The leech, Latin *Hirudo*, plural *Hirudines*, has been used since the earliest times. Family quarrels then, the same as to-day, ended with a black eye or other bruises, and leeches were then employed as a relief. The Bible does not mention such an occurrence about Adam and Eve or their descendants, but states in Proverbs XXX, 15: "The leech hath two daughters, crying Give, Give."

In old Indian medicine leeches were used, according to Susruta in his "Ayur-Weda," supposed to date back to 1300 B. C. The followers of Hippocrates (about 400 B. C.), the father of the Greek school of medicine, did not employ leeches, as they preferred blood-letting. Plinius (about 50 A. D.), the celebrated Roman historian, in his "Historia Naturalis" describes the uses of leeches for withdrawing

* Section on Practical Pharmacy and Dispensing, A. Ph. A., Cleveland meeting, 1922.

blood. Avicenna (980–1037), the King of the Arabian physicians, devotes an entire chapter to leeches in his works.

Before the advent of the Norman conquerors English medicine was entirely in the hands of the Saxon "leeches," whose folk medicine is preserved in the "Leech-Book" of Bald and other Anglo-Saxon "Leechdoms." No doubt the use of leeches was responsible for the coinage of these words. Perhaps the greatest advocate of leeching was François Josephe Victor Broussais (1772–1838), the son of a Breton physician who served for three years as an army surgeon in Napoleon's campaigns. With methods which were Napoleonic, and with therapeutics which were sanguinary, he leeched the patient over the entire body, applying as many as 50 leeches at once. As a consequence the consumption of leeches in France rose from two million in 1824 to thirty-two million in 1833, verily an increase!

I must not forget to mention that the Zoölogy of the last British Pharmacopœia (1914) includes leeches. Erroneously the monograph in that standard is entitled "Hirudo—Leeches," truly not a credit to the Latin knowledge of the compilers.

The writer runs an old-fashioned and old established (1874) drug store, with the proud motto—"No Cigars, No Candy, No Ice Cream, No Soda Water, But I Do Sell Pure Medicines." Here in this atmosphere free from the lunch room odor my armamentarium consists of drugs and preparations from the vegetable, mineral and animal kingdoms. Among the latter are leeches, prominently displayed in a number of glass jars in different parts of the store, including one in the show windows. Anything moving, anything odd, arouses the curiosity of the public, and my reputation as a "leecher" has spread far beyond the "City of Churches." Besides, this leech business is also profitable, as they are retailed at $1.00 per head without any trouble; in fact, patients are only too glad to be able to obtain them. A friend in need is a friend indeed!

HOW TO DISPENSE LEECHES.

For years and years I put the leech when called for into a small tin box or, when several leeches were wanted, into an ointment jar, with the addition of a small quantity of water, as the leech should not be allowed to become perfectly dry. However, the customer is usually inexperienced as to how to apply them, unless he is a prize-fighter accustomed to black eyes and bruises. The average man or woman is usually somewhat afraid that the leech will not suck at the right place, or may even crawl into the eye.

I remember that many years ago leeches were applied by being put into glass tubes, so-called leech tubes. I do not know whether these tubes are still manufactured. At any rate, my present method is to place the leech, when asked for, into a perfectly clean glass test-tube, add a little fresh water, and cork it. It is very essential that the test-tube be new and clean, as leeches are very susceptible to chemicals, and consequently will not suck, or will even die.

I usually select a rather narrow test-tube and in that case place the leech in it so its large end, or its large sucker, is toward the sealed end of the tube. If the test-tube is wide enough I do not pay any attention to this, as the leech can easily turn around in the tube. It should be remembered that the posterior extremity of the leech terminates in the large sucker, which is merely used for hanging on objects, but that the anterior extremity is the small sucker, or head, with

its triradiate jaw which pierces the patient's skin and sucks out the patient's blood.

HOW TO APPLY LEECHES.

It is essential that the surface of the skin where the leech is to be applied is perfectly clean. All medicine, even such a simple preparation as witch hazel, must be thoroughly washed off. Even soap odor or taste is objectionable, and the leech will persistently refuse to take hold. After all, such a little leech is mighty particular! Before applying the leech in the test-tube it is best to rinse him off with a little water. This water douche will stimulate and refresh the leech so that he will be anxious to bite. Should he, however, refuse to do so, then place a drop of milk or blood on the very spot where you want him to suck, and the leech will invariably "fall" for such a decoy.

ADVANTAGES OF THE TEST-TUBE METHOD.

1. Clean, sanitary method of supplying leeches to patients.
2. The leech can live in the test-tube with water for some time, thereby facilitating transportation.
3. Ready for use.
4. Can be applied to the *exact spot where the leech is* required to suck. This is perhaps the greatest of all advantages and my idea based upon the old leech glass.
5. A better compensation can be derived.
6. Customers appreciate this service and convenience.

After all, at the price of $1.00 per leech the pharmacist can well afford to "throw in" a test-tube.

BROOKLYN, N. Y.,
JULY, 1922.

KEEPING ETHICS ALIVE IN A MODERN DRUG STORE.*

BY S. W. LEIDICH.

Sixty-five years ago Llewellyn's Drug Store was started in Philadelphia.

From the first, the aim of its founder was to conduct the business in such a way as to make consideration for the ethics of the medical profession a cardinal point in the conduct of the establishment. At the same time, it was of course recognized that the rights of the general public constitute the bedrock foundation upon which all commercial or professional transactions, as well as those of a social nature, must be based.

To nail such a purpose to the mast-head of a drug business in 1857 was not such a difficult task. At that time the average pharmacy was nothing more nor less than a pharmacy. Its stock was composed entirely of drugs, chemicals and such medical and surgical appliances as were in common favor.

No one ever thought of going to a druggist's for anything which did not, in some way, have to do with the tendency of the human machine to get out of order. In those "good old days" there were some pharmacists who would not even sell eau de cologne except on the doctor's order.

Those of us who happen to have been unborn at that particular period of the passage of time can hardly begin to appreciate the vast distance that separates 1857 from 1922, when measured by what has taken place in our line of activity—

* Section on Commercial Interests, A. Ph. A., Cleveland meeting, 1922.

or any other line, for that matter. And unless Heinz or some one else preserves us from a riot of revolutionary methods, another decade or two may so change the identity of the present-day drug store as to make even our contemporary ideal a real curiosity to the young pharmacist of 1950.

Meantime, it is interesting to note, in passing, that despite the radical changes which have come to pass within the last half century, it still is possible to maintain in a modern drug store a reasonable measure of regard for those standards of the medical profession which stand with the firmness of the laws of the Medes and Persians.

The revolution that has taken place in the methods and scope of the drug store smacks of fairy-tale stuff.

The modest little shop, with its gilded mortar and pestle swinging from over the entrance and its multi-colored globes serving as sole decoration of the front windows, has given way, in our so-called march of progress, to a veritable jazz palace in many instances.

To-day we have many drug stores in which drugs appear to play so small a part as to be almost negligible, and one is tempted to wonder why they are tolerated. Some of these institutions seem to emphasize everything but drugs—I have in mind a "drug store" in a popular English sea-coast resort where more than half of the very large floor space is given over to a restaurant department, and where the prescription counter looks like a canary's cage lost in the glowing wilderness of a world's fair.

The object of this brief paper, however, is neither to blame nor bless anyone, but to remind those in the retail drug business that there is such a thing possible as keeping step with advancing times without losing step with certain firm-set principles which are almost as old as the hills, and which none of us can well afford to ignore.

Doubtless the new kind of drug store—the sort which stresses everything but drugs—has come as an answer to a public demand. That is the real reason behind many of our ultra-modern developments, and so long as the people seem to want them, we give them to the people. At the same time, we must remember that there rests on us a responsibility to give the people what they need as well as what they may want.

As many of you know, even in this day of an entirely new kind of drug store, we can steer between the Scylla of a notion shop and the Charybdis of a laboratory, and produce a place where ordinary human beings may be made to feel quite at home and where members of the medical profession may, at the same time, find high and constant regard for their time-honored code.

To do this it is necessary to modernize in many directions, but the wise druggist is the one who sees to it that such improvements do not entirely cover up the basic purpose and meaning of the business he is conducting.

The key-note in this sane policy is to keep the prescription counter the heart of the business, to look upon it as the most important feature of the store and to guard its efficiency and reliability as he guards his personal honor and integrity.

Naturally, toilet articles and accessories have a proper place in the drug store, for in many instances they not only play a large part in the prevention of disease, but likewise in its treatment and relief. Cleanliness is the real first aid to health,

and anything which helps people to keep clean helps to lower the incidence of disease and keep the mortality rate below the danger line.

This point is emphasized because there seems to be a tendency on the part of many druggists to play up other departments of the modern drug store in preference to the prescription counter. Undoubtedly, this is a mistake. In the long run—and the long run is what counts—the people are going to depend for drug accessories on those drug stores which most promptly and dependably supply their needs when sickness menaces individual or family happiness and prosperity.

Now as to publicity.

Of course, in this day and age, a drug store, like any other business, must meet competition in part by keeping itself before the public in the newspapers and other mediums of publicity. And where drug store advertising is done with regard for both sides of the army of supporters—the public and the profession—it can never offend either, and in time will benefit both.

Personal experience has proved that large results may be obtained from persistent use of comparatively small space in leading newspapers, and use of such space in telling, simply and without any touch of sensationalism, the story of service which must be at the root of any drug store which is to lastingly succeed.

This service must always assume as much of a personal side as possible. The druggist, more than any other business man, comes into close confidential touch with his customers—or with many of them—and he must inspire their confidence not only by giving them dependable service, but also by exhibiting, and feeling, some measure of real interest in their behalf.

The best type of modern drug store does not eschew the soda fountain and handsome or even showy equipment, but at the same time, it does not depend upon these attributes to give it place and standing in the community. It remains faithful first to the health needs of those who patronize it, and never is unmindful of the fact that the reputable physician is its best and most valuable ally.

If it enjoys the advantages of a laboratory department in which certain preparations are skillfully compounded, it sees to it that such of these as appertain to the treatment of involved conditions requiring skilled diagnosis are put up and sold for prescription use and not indiscriminately passed out to everyone who details what may or may not be a leading symptom. This is a feature which never can fail to secure the confidence of the medical profession.

The best and most useful type of drug store does not have to do with any but the most competent pharmacists in its prescription department, and it demands trained and even skilled help in its other selling departments. With so many mediums for help or harm within its scope, it cannot afford to take any risks.

It aims, first of all, to serve as a medical service station, and whatever else it may seek to become must be attuned to this purpose. It must, by its equipment and the attitude of its staff, impress those who come in with the seriousness of its attempt to minister to the needs of its patrons, and at the same time, to have regard for their wants and their fancies. But to reverse this order, and play first to the fancies, is not the goal that should be sought.

Long experience, attended by a constantly increasing harvest of success, has taught at least one drug store that it pays to consider such principles.

And in this lesson it does not stand alone.

THE HOSPITAL PHARMACIST AND HIS IMPORTANCE.*

BY EDWARD SWALLOW.

The hospital pharmacist should insist upon having the proper apparatus to work with so he can do his duty by the patient, doctor and the hospital in the best scientific manner possible.

He should make it his business to examine all drugs and chemicals used by him, so he is certain of their purity. It is not enough for him to merely compound and prepare, he must know that the patient is getting, as far as the proper exercise of his art goes, the medication of the U. S. P. standards. All solutions and other preparations which lose their activity should have a date of manufacture upon each container, indicating also the time after which they should not be used.

It is absolutely necessary that the pharmacy be equipped with modern sterilizing apparatus to allow of solutions, etc., being prepared as required. Improvements of every kind are in order in an important place like the hospital pharmacy.

Up to the last few years the position of hospital pharmacist, generally speaking, has not been an enviable one, and there is still opportunity for betterment. In many hospitals he is classed with the ordinary help, and therefore does not command the respect he is entitled to by reason of his professional training. He is not exactly looked down upon but his standing as a professional man is ignored, and this attitude has the tendency to make his position of less importance than it really is. He owes it to himself to see that this is changed. Also, he should draw the attention of his State organization to any violation of the Pharmacy laws by hospitals employing unregistered help for the compounding and dispensing of medicines.

He should insist upon being classed with other professional men in the hospital, or see that the standard is raised. Individual effort will count a whole lot, and, as hospital men will in the future represent the strictly professional part of our calling, it is up to them to add all the dignity to their work they can.

The hospital pharmacist should apply himself to original research; not how little education is essential but how much education he can gain should be his purpose. He should be well informed in bacteriology, physiology, and other subjects essential in clinical laboratory work.

Every hospital pharmacist represents his whole profession in the eyes of those around him; the more important he makes his position the more dignity and honor is added to his calling, so the ethics of the profession cannot be too carefully lived up to.

Hospital pharmacists should meet frequently, work together and stick together as members of the American Pharmaceutical Association, which is behind them in all worthy endeavors for the honor and advancement of the profession of pharmacy.

NEW YORK ARBITRATION EDUCATIONAL WEEK.

The week of May 7 to 12 will be "Arbitration Educational Week." In that seven-day period commercial associations and trade organizations in New York City and State will unite in an intensive effort to make known to all citizens the benefits to be derived by making use of arbitration in the settlement of business differences and disputes.

* Section on Practical Pharmacy and Dispensing, A. Ph. A., Cleveland meeting, 1922.

THE BUSINESS SIDE OF PHARMACY

This department is devoted to the discussion of problems of business administration and commercial policies relating to the various branches of pharmacy.

CONDUCTED BY DR. ROBERT P. FISCHELIS.*

Certain writers on business topics deplore the fact that retail druggists meet the salesmen of concerns offering new products with the stereotyped statement: "We shall stock your product as soon as there is a demand for it." These writers and, of course, the salemen also, characterize the attitude of the pharmacists toward new merchandise or new pharmaceutical preparations as expressed in the quotation above, as being a sign of backwardness on the part of the druggists in merchandising ability. The shelves of most drug stores, especially in the prescription department, give the most eloquent answer to these critics of the retailer who has decided to stop making his store a dumping ground for merchandise of questionable sales possibilities or prescription products which are never prescribed. Show the druggist some real advertising of a meritorious article or some actual detailing of physicians with a valuable prescription product, and there will be no difficulty in securing his coöperation.

Of course there is much to be said on both sides of this matter and for the purpose of a helpful discussion of it, we must assume that the average retail druggist is anxious to spend a certain amount of effort in helping the sale of good merchandise which yields a proper profit and is extremely anxious to carry such pharmaceuticals of a proprietary or special nature as are prescribed with any degree of frequency by physicians. Assuming such an attitude on the part of the druggist there certainly rests upon the manufacturer or his distributor a certain obligation before he can demand the wholehearted coöperation of the retailer.

Let us consider first the prescription products. It is a common occurrence to have the salesman of a pharmaceutical house come to the store, take an order for fluidextracts, tinctures, perhaps a specialty or two that is used by local physicians and then proceed to tell about some new preparation which the "House" is putting on the market and endeavor to persuade the buyer to place some of it in stock. At this point the novice, who is unaccustomed to the usual chatter about detail work that is being done among doctors, advertising in medical journals and mail distribution of literature, is apt to accept such statements at their face value and place an order for a pint or a pound or a dozen as the case may be and too often such products remain on his shelf unopened and are finally returned or disposed of at a loss. The deal has been unsatisfactory all around. True, the salesman sold some of the new product, but his "House" eventually had to take the goods back. This druggist was harder to convince on the next new product offered him by that salesman and he very likely judged other salesmen in the light of this experience and thus offered more sales resistance to other firms which really live up to the salesman's promise.

The most successful pharmaceutical houses know that it is folly to expect these new prescription products to move off the druggist's shelves without per-

* Dean New Jersey College of Pharmacy.

sistent detail work and dealer helps in the form of samples and literature distributed directly to the Doctor by mail or through the druggist who is willing to coöperate. The trouble is not so much with the "House" as it is with the salesman. Many manufacturers expect their salesmen to detail doctors where they have good druggist customers. Without going into the merits or demerits of detail work by salesmen as compared to detail work by special detail men, let it be said that the retail druggist who stocks any manufacturer's new product without being shown that the manufacturer through his sales or detail man is creating a demand for it, is extremely foolish unless he decides to do the detailing himself or through his own organization, and very few ever do.

When a salesman talks "new product" and says "it is advertised," ask him where it is advertised. He ought to be ready to tell you in what journals and if he is at all progressive he ought to have a proof of the advertising with him. Incidentally it might be well to note whether the copy directs the physician to the pharmacy for his source of supply. The nature of the medical journals in which the copy is appearing is also important. One journal is not apt to reach the entire medical fraternity in any given locality, nor is a journal with a low advertising rate apt to have much circulation. Find out which journals your doctors read. Next it is well to inquire when the advertising campaign and detail work in your territory is to start. Be sure you find out whether the salesman himself or some special man is to do the detailing and exactly when, and then offer a list of the physicians you want visited if you stock the product. Many manufacturers now offer to send letters to the doctors on the druggist's letter head. This should be accepted provided there is a paragraph or two about the druggist's own prescription service in addition to the manufacturer's advertising.

A personal chat with one or more of the doctors who have been detailed, as the opportunity presents itself, will soon establish whether or not the product is being received favorably. Only in this way can the druggist determine whether to reorder or not. Some physicians will try anything once but if they fail in obtaining results they turn to something else and the prescriptions, which came often for a few days, cease suddenly. Naturally no high grade manufacturer wants to clutter up the druggist's shelves with unsalable goods for, in the end, he is as much a sufferer as the retailer. It is in the interest of pharmaceutical progress for the retailer and manufacturer to coöperate but the retail pharmacist should have his eyes and ears wide open and make sure that he is getting coöperation as well as giving it.

Considering now the general merchandise commonly sold in drug stores, we may formulate the same general rule of making sure that the manufacturer is doing his part to move the goods after they are placed on the retailer's shelf. In this case there is more of an opportunity for the druggist to show his own salesmanship as the goods are sold directly to the public. However the pharmacist should exercise due discretion in the kind of firms he coöperates with and the goods he helps to create a sale for. Not only profit, but ultimate value to the public must be a deciding factor in determining what to push, otherwise he is not "more than a merchant." Look out for the concerns who make one big advertising splurge and are never heard of again. Persistent advertising is necessary to keep up the demand for certain special brands and unless there is a reasonable guarantee that the advertising will be continued over long periods it is better to spend the time and

energy in building up sales on your own private brand of various side lines than to help a manufacturer. Let the salesman furnish proof of the "enormous demand" that is to be created according to his talk. If he really has a good proposition he will have convincing evidence with him; if he has not, the time to find out is before you tie up capital, energy and space on a gamble.

"We shall stock your product when there is a demand for it" is a good answer in the majority of cases. As the retailer gains experience he can judge pretty well what the possibilities of a line or an individual product will be in his neighborhood and how far he can afford to go in getting it started. Coöperation should be given to the concerns who can show an honest merchandising plan and a fair possibility of permanency, others do not deserve it.

FINAL CHAPTER OF THE MILLER EXAMINATION SCANDAL IN ILLINOIS.

BY H. C. CHRISTENSEN.

Secretary National Association Boards of Pharmacy.

Across the top of the first page of *The Chicago Daily Tribune*, of January 29, 1923, running from margin to margin, in the usual big type employed to announce important events, occurs this caption:

"CONVICT MILLER AS GRAFTER"

and as a heading to the column giving the details, the following:

"JURORS FIND APPOINTEE OF SMALL GUILTY"

and in smaller type,—"Dr. Bourque also sentenced."

So at the end of practically a year, the flaming disgrace of examination rottenness in Illinois, which had befouled the very name of this sovereign State, came to its legal close. The moral wounds will be long in healing.

W. H. H. Miller, former Director of the Department of Registration and Education, escaped with an insignificant fine of $1,000.00. This could be but an inconsiderable part of what he collected in the illegal trafficking in pharmacy and medical licenses. The State's star witness testified that he had paid Miller $8,500.00, submitting cancelled bank cashiers' checks totalling this amount—and he was but one. Bourque no doubt collected and paid Miller large sums, and there were other sources. Many men and women who never even attended the "Miller authorized" medical and pharmacy "Quiz Schools" where the majority of the "put over" prospects were "fed" on answers to the State examination questions, were nevertheless granted licenses, for which they paid money. For example, it seems fairly well established that there were many who flunked or did not write on examination, and whose names did not appear in published lists of those who passed—who were subsequently approached and having duly satisfied the "fixer," were granted certificates.

It would probably be no exaggeration to estimate Miller's illegal gains at $100,000.00, for which he paid a fine of one per cent. Not a bad return for a year's work. A good investment from a financial viewpoint, and it is entirely possible Miller so regards it.

The question promptly presents itself—If Miller was guilty as the Jury found, why was he not penalized by a larger fine, or by imprisonment, or by both, as provided by law for the crime committed? That is a hard question to answer. Evidently it was a compromise verdict. It is rumored that one man was going to "hang the Jury." How that man got on the Jury, some one might be able to explain. The verdict is ably described in an editorial in the *Chicago Daily News* of January 30, 1923, as reproduced below:

"COMPROMISE WITH CRIME IN OFFICE."

"No sort of criminality is more despicable than that of the public official who accepts bribes and betrays his trust in exchange for them, thereby selling his honor for cash. His conduct, reprehensible enough when it involves only money or other material things of value intrusted to his care, becomes infinitely worse when it menaces the lives and health of the people whom he has sworn to serve.

William H. H. Miller, who was tardily removed by Governor Small from his position as head of the state's department of registration and education after being indicted on charges of selling physicians' and pharmacists' licenses to persons unfit to receive them, of selling questions in advance of examinations for those licenses and of raising the grades of persons who had failed to pass such examinations, has been convicted on those charges by a Cook County Jury. How many lives have been endangered by men and women who paid money for the fraudulent licenses received by them at Miller's hands can never be known. It was developed during the trial that in addition to granting licenses to persons who had failed to pass the examinations, Miller granted licenses to numerous other persons who passed satisfactorily only after they had paid for and received in advance the questions asked of them at the examinations.

For bribes paid to him directly or through his agents, according to the testimony, Miller issued certificates to men and women absolutely unqualified to practice as physicians or as pharmacists in Illinois—to write or fill prescriptions on the correctness of which human lives depend. Yet, through a compromise verdict, Miller escapes the prison sentence which the state's attorney's assistants demanded of the jury as his just due. Consequently he will be permitted to go free on the payment of a $1,000.00 fine, even though one witness testified during the trial that he alone had paid Miller $8,500.00 for a set of questions to be used at a medical examination.

The public will feel some satisfaction because so faithless a servant has been declared guilty. Here, however, was a case that should have been made a conspicuous example to grafters in public office. Jurors supposed to express the unprejudiced view of the whole body of the citizenship should know that compromise with corruption in places of official power is compromise with the forces that tend to destroy popular government."

The exact jury situation which makes such a miscarriage of justice possible is succinctly set forth in an editorial of *The Chicago Tribune* of January 30, 1923, extracts from which we quote.

"The verdict of the jury in the trial of W. H. H. Miller, former chief of the State Department of registration and education, is a *scandalous failure of justice.* *.... How is it that twelve citizens can let off such an offense with a $1,000.00 fine? .... How does such a failure of justice occur? There is a report that one juryman was not in favor of any penalty and that a compromise was reached. This is not a satisfactory explanation. The compromise was wrong and it was not necessary. .... We do not think such a verdict represents the intelligence or moral perception of the average citizenship from which juries are supposed to be drawn. .... Are we getting a grade of citizenship on our juries we ought to get or are we getting a subgrade? How efficient are the safeguards against the planting of purchased or purchasable men on juries?

We have no intent to exaggerate the significance of a special instance, but isn't the subject of justice and the jury system worthy of a practical inquiry?"

If one reads the lines, and between the lines, of the foregoing editorials, it must be pretty obvious how it happened that Miller escaped with such a light sentence.

* Italics are ours.

Naturally, with the money in his pocket, plenty of it, that he had collected in the illegal trafficking in licenses, Miller could well afford to spend liberally to clear himself. Added to this was the fear of a prison term, so it may reasonably be assumed that he went the limit in the employment of Counsel and all of the tactics of criminals in these unsettled days. It was a compromise verdict where apparently eleven men who would have given Miller the limit—$2,000.00 fine and five years in the penitentiary—compromised on a fine—after being out nineteen hours—in order not to have a jury disagreement.

However, the verdict legally establishes the fact that Miller was guilty, notwithstanding his vociferous claims to the contrary. One of his confederates, the "notorious Bourque" who conducted a "school" was also convicted.

As the trial progressed, pharmacy and the irregularities of pharmacy examinations took a minor place and the exposé in medicine took the lead. As a sequel to this conviction, both pharmacy and medical licenses have been revoked and others will no doubt be cancelled. This in itself will have a purifying effect. Take away a pharmacist's or a physician's license, obtained illegally, and you have fined him for life. It also has the effect of scaring away the "crooks and suckers" who are willing to pay money for licenses. Obviously, if there is none willing to pay money for license, the crookedest of officials will, perforce, be honest.

Despite the lightness of the penalty imposed in the Miller case, his conviction can well be regarded as a *moral victory* for the people of the commonwealth. Miller, as a public official, degraded his trust, a high office within the gift of the people, and he has been convicted. That will have a salutary effect. Few men relish the stigma of conviction of a crime—even if their material returns are great.

The question uppermost in the minds of men having the sanctity of the profession at heart will be how to prevent a similar crime occurring in their own state. What are the conditions that tend toward this violation of the law of the land? How may such a thing be avoided? Without appearing to harp unduly on the topic I cannot refrain from repeating what I have said often in the past, which is that the "consolidation of boards," placing the control thereof under a political head who does not and cannot have the ingrained regard and respect for the ethics of the professions and the safeguarding of the public health and welfare which is necessary, is the cause of all this. The tremendous volume of business incidental to the supervision of the various Boards, the possibility of such large returns if one goes wrong, all tend to a condition which makes possible a situation similar to that in Illinois.

So far as I know, we have yet to hear of a man heading any single Board in any state, be he secretary or president of a Board of pharmacy or medicine, who has disgraced his state as this state has been disgraced under "Consolidation."

Keep your individual boards. Have men on these boards recommended by your State Associations, men who sense the requirements of the profession they represent, make them feel their responsibility to their profession and to the public, and you will have little trouble.

Let us hope that the states seriously contemplating "Consolidation" will ponder well the experiences of Illinois before they act. The so-called economy and efficiency are, in my opinion, largely mythical—they have proven so in Illinois. And even if there is slight economy in spots and, possibly, more efficiency in cler-

ical duties, would this justify measured dollars against the advantage of maintaining a high standard in your various professions, which after all furnish the protection to the public contemplated under the law?

The menace of dishonest administration has, for the time being, been removed from Illinois pharmacy, but consolidation has not ceased to hamper our profession. Something over a month ago, our Pharmacy Board which under consolidation is appointed from examination to examination, and may be discontinued at a moment's notice, was wiped out by the dismissal of three members on a charge of dishonesty preferred by the Department. Despite the fact that over a month has elapsed since these charges were preferred, and the next examination is but two weeks away, these men, prominent in their profession, are held under the odium of charges which have been neither proven nor withdrawn, and their successors have not been named.

Picture a state the size of Illinois, running practically two months with no Pharmacy Board—no one authorized *by law* to approve credentials, issue certificates or act on reciprocal applications. And when we realize that the whim or panic of one man can bring about such a situation—or worse—any time he wills it, we have a mighty good argument in favor of returning the control of our profession to seasoned, tried men, chosen by the pharmacists of the state, for their ability to administer the affairs of pharmacy with dignity and impartial honesty, and a loyalty to the public foreign to an unprofessional office-holder.

FOOD-DRUG INSPECTORS WANTED.

An examination for food and drug inspectors will be held by the United States Civil Service Commission April 25. It is purposed to fill vacancies under the Bureau of Chemistry, Department of Agriculture, for duty in Washington, or in the field, at an entrance salary of $1600 a year, plus the increase of $20 a month granted by Congress.

Competitors must have graduated from a standard high school, or must have completed 14 units of high school work acceptable for college entrance. Credit will be given for experience in inspection service and for other preparatory training.

The examination will consist of practical questions designed to test the competitor's general store of information on methods of investigation, and his judgment and powers of concentration; a thesis, to be delivered to the examiner on the day of the examination, and a rating on general fitness, education, and experience. Full information and application blanks may be obtained from the commission at Washington, or the secretary of the Board of Civil Service Examiners at the post office or custom house in any city.

MEDICINAL CAMPHOR BY SYNTHESIS.

Synthetic camphor, for medicinal use, will be produced by a new factory in Fügen, Austrian Tyrol. This is the first time that camphor, of the same composition as the natural product, has been made commercially. Artificial camphor formerly was restricted to industrial use. The process is the invention of an Austrian chemist, Anton Gawalowski.

A report on the subject was printed in the *Apotheker-Zeitung* (New York), November 1921, p. 114.

PRESERVATION OF GLUE AND ACACIA SOLUTIONS.

In *Chemiker Zeitung*, 1922, page 922, there is described a new disinfectant, known as Parol. This product has a strong action against bacteria and also toward the formation of molds. When used in a 0.1 per cent. solution, which is as strong a solution as is necessary, it is nonpoisonous, almost odorless and has no irritating effect. It may be used in the place of mercury sublimate, carbolic acid, cresol, etc. About one gram of the substance is required for one liter of glue solution.—*Scientific American* for March.

THE DEPARTMENT OF THE AMERICAN CONFERENCE OF PHARMACEUTICAL FACULTIES

[EDITOR'S NOTE.—It seems to be a growing belief among laymen, and even among practical druggists, that one of the chief functions of a College of Pharmacy should be to produce practical and safe compounders of drugs and distributors of poisons. So thoroughly did the citizens of Virginia believe in this, that the thought of the people crystallized into the form of a law, which was enacted by the legislature of that state two years ago. The passage of that law placed immediate responsibility for producing the proper type of dispensers upon the one College within the State, the School of Pharmacy, of the Medical College of Virginia. In order to show how this institution is meeting the situation we are printing in this issue an article by Professor W. G. Crockett of the teaching staff. Every Conference school, as well as every Board of Pharmacy, will do well to follow closely the Virginia experiment. If the Medical College of Virginia makes good at the task given it by its legislature, it means the death knell to store experience, which all of us know, and most of us are willing to say, is an anachronism. If the Medical College of Virginia shows that it can make capable and safe dispensers, without store experience, there is no reason why the rest of us cannot if we use the same effort. The paper along similar lines by Dean W. J. Teeters of Iowa, is a fitting companion to Professor Crockett's, and the one by Dean Spease of Cleveland (p. 146, February JOURNAL A. PH. A.) again points out what should be accomplished in the training of the Pharmacist. This thought cannot be too often repeated.

R. A. LYMAN, *Chairman, Executive Committee and Conference Editor.*]

DISPENSARY AND HOSPITAL TEACHING IN THE MEDICAL COLLEGE OF VIRGINIA.

BY W. G. CROCKETT.*

Many of you are familiar, undoubtedly, with the law which went into effect in Virginia recently making it possible for a high school graduate, who has in turn graduated from a recognized school of pharmacy, to apply for registration without having had any previous drug store experience. The legislature of Virginia passed this law on its own initiative, basing its action on the fact that no such preceptorial training is required of physicians and dentists. Since studying the question closely, we in Virginia have become convinced of the wisdom of such action on the part of our law-making body.

We as educators in pharmacy have two well defined functions to perform. First, we must so train our students that they will be of greatest service to the public. Second, we must strive to the utmost to ameliorate working conditions within our ranks, and thus attract the more worthy young men and women into our profession.

In seeking to attain this object, if good judgment dictates that we discard certain teaching and preceptorial methods which may have been of inestimable value in the past, we should yield them willingly and adopt others which more nearly suit conditions rather than retain them for their traditional associations.

The apprenticeship system, although it has been of great value in the past, does not fulfil its mission at present because it militates against the future prestige of pharmacy by repelling from our profession promising young men and women who should be attracted to it. This is a day of specialization. Opportunity for service, financial reward, working conditions, educational and preceptorial re-

* School of Pharmacy, Medical College of Virginia.

quirements, and professional status after graduation are deciding factors in the mind of the youth who is contemplating studying a profession. Furthermore, medicine, dentistry, engineering and other professions are our competitors. These latter ones have advanced by leaps and bounds not because their opportunities for service are greater than ours, not because their average financial reward is far in excess of that offered by us, but because the entrance to ours is obstructed by a barrier known as "Two years of servitude at nominal salary," during which time the duties shall consist chiefly of tending a soda fountain, selling stationery and trafficking in patent medicines.

Bear in mind the fact that our duty in educating pharmacists consists chiefly in making them proficient in the art and science of compounding and dispensing, and in offering them such basic principles as will serve to protect their interests in business. This can be done as effectively during a college course as it can in the two years of apprenticeship that precedes or follows it. Furthermore, the alert young man of to-day who has graduated from a high school, the one who has been reared amidst good surroundings and is inspired with high ideals toward service and professionalism, the one who should constitute the fiber of the pharmaceutical structure that we are to build for the future, looks with disdain upon the two-year period of servitude which leads to the portals of pharmacy.

When he stops to compare our profession with others that require four years' training his decision to choose another is not surprising, since in the latter he can devote the entire period to technical study and thus place himself on a higher professional plane, and since working conditions and financial reward are not sufficiently attractive in pharmacy to compensate for the two years of distasteful and slightly productive apprenticeship required. As a result, a large mass of the pharmacists who are in the making to-day consists either of those who have not sufficient funds to enable them to pursue some other course, or of those who have drifted to us because they are of the type which follows the line of least resistance.

The apprenticeship system in the past was necessary and useful; to-day it is an obstruction to progress. The sole question in the minds of those who would remove it should be: "Can the colleges offer during their regular course in pharmacy, a sufficient amount of actual prescription compounding and dispensing of medicinal substances to enable them to equip a pharmacist within their own walls?" This can be done and is being done, hence it resolves itself into a question of willingness, facilities and financial resources on the part of the colleges. Those schools which are located in cities should find no difficulty in establishing connection with pharmacies which are maintained by hospitals and free dispensaries. In fact we found in Richmond that such institutions welcomed our assuming control of their pharmacies for teaching purposes.

The School of Pharmacy of the Medical College of Virginia now operates two separate and distinct dispensing pharmacies. One of these is fed by the clinic in our medical school and the other is maintained by the three allied hospitals owned by the Medical College. The former has been operated by us for several years, but we assumed control of the latter only recently, that is, after the enactment of the law referred to above which makes it possible for graduates in pharmacy to become registered without having had any previous drug store experience.

Approximately ninety prescriptions a day are filled in these two pharmacies, and during the college session all the compounding is done by our senior students under the supervision of four graduate, registered pharmacists. At the beginning of each session the senior class is divided into small sections and each section assigned to dispensary duty for a period of approximately three months. It is so arranged that all prescriptions are delivered to us between the hours of one and two, and four and five, hence, during the three months' period each student compounds an average of eight prescriptions a day.

The prescription experience is quite varied, as there are seventy physicians on our dispensary and hospital staffs. In addition to this, many of the patients in the hospital are under the care of their own private physicians. We are safe in assuming then that the prescriptions which come to us during the college session are written by a minimum of eighty physicians. We dispense no stock solutions, but on the contrary it is the policy for the physicians to prescribe whatever they think most nearly meets the needs of the patient, regardless of cost. Our hospital pharmacy carries a complete line of proprietaries, serums and vaccines, with which the students become familiar.

Satisfactory service in dispensing is now our most rigid requirement for graduation. No student is recommended for graduation who has not convinced the four registered pharmacists in charge of his dispensing that he is a good and safe dispenser, even though his rating in other subjects may have been excellent.

In conclusion, we in Virginia maintain that by proper utilization of the facilities offered by hospitals and dispensaries, adequate experience in compounding and dispensing can be offered the student during his college course to make him sufficiently proficient in this respect to entitle him to registration. However, in order that this be a success certain precautions must be observed: financial resources and teaching facilities must be adequate; classes must be divided into small sections for teaching purposes and the instructorial force must be sufficiently large to permit of individual instruction.

These conditions have been fulfilled by our college. Virginia has taken a progressive step which eventually will place pharmacy in that State on a plane with other professions. With firm conviction in the wisdom of our course we invite your closest scrutiny of our work and its results. May your criticism not be tainted with prejudice. When pharmaceutical educators admit the faults of their preceptorial methods and meet in common council with open minds and unbiased judgments to rectify the errors of the past, then and only then will pharmacy command from the lay and professional world the recognition which it so justly deserves.

THE HOSPITAL DISPENSARY AND COLLEGE OF PHARMACY.

BY W. J. TEETERS.*

Probably no part of the work of instruction in Colleges of Pharmacy differs so much as the teaching of prescription work. This is due to the fact that conditions are different at the various institutions. It is very evident that institutions connected with Medical Colleges, if the dispensary is in charge of the College of Pharmacy, has a decided advantage. Under such an arrangement the student

* College of Pharmacy, University of Iowa.

can, under proper supervision, get actual practical experience which, if carefully planned, will better prepare him for this phase of his profession than the experience he can get to-day in 90 per cent. of the drug stores of the country.

There are certain things about the drug business that cannot be learned in college, but prescription work, under the conditions stated above, is not one of them and some recognition of this fact should be made by State Boards of Pharmacy.

Naturally certain prerequisite studies should be required before this work is started, such as inorganic chemistry and at least one semester of organic chemistry, materia medica, physiology, pharmaceutical mathematics, and theoretical and practical pharmacy.

Lectures and stereopticon slides of actual prescriptions are not enough but should be accompanied with carefully planned laboratory work to "burn the subject in" and either Scoville's or Ruddiman's Text or both should be used as reference and guide.

From the fact that this subject has only recently been under discussion in the Journal of the American Pharmaceutical Association, and the fact that the College of Pharmacy of the University of Iowa was one of the first to develop this method of giving the students practical experience, while in college, it may be of interest to briefly outline the procedure:

The laboratory work is given in conjunction with the didactic course as far as the filling of laboratory prescriptions is concerned. The theoretical and practical work, in the main, should precede actual Hospital work, as nearly as it can be arranged. It should be stated that the laboratory preparations of the senior year are all used in the Hospital and the student instead of making a few ounces of a preparation may make many gallons, depending upon whether there is a great use for it or not. This laboratory work includes the making of all U. S. P. and N. F. preparations and innumerable formulas, reagents, stains, photographic developers, soap, toilet preparations, etc. The result is this—the very fact that the student knows that the material is to be used creates more interest on his part as to manufacture and greater care and cleanliness.

This work is carefully supervised by assistants and all weights and measures checked to avoid possible errors.

The Dispensary of the University General Hospital, the Children's Hospital, Urology Hospital, Psychopathic Hospital, Student Health Clinic and Out-Clinic are under the direct charge of the Dean of the College of Pharmacy and, since 1905, have been by action of the Board of Regents.

The various hospitals have a capacity of some 625 beds and the student health clinic looks after the welfare of some 6000 students and, at certain times of the year, furnishes abundance of work.

Two registered pharmacists are employed in Dispensary work. The senior class is divided into sections of twos, a number that can be carefully instructed and supervised. The student spends two hours or more per day in the Dispensary, Sundays included.

The general Dispensary of the University Hospital is equipped with every convenience possible for service. The average number of drug orders and prescriptions is well over 4000 per month and includes every phase of prescription work, including of course the dispensing of narcotics and biologicals.

We believe that we have solved the problem of giving our students thorough and practical work in what should be the test to determine the students' skill in the profession of pharmacy, but the sad part of the story is this—many of our graduates in practice, especially in the smaller towns of Iowa, would starve to death if they depended upon their prescription business for a living. This again is a different story, but the successful solution of one problem may lead the way to the solution of the other.

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and its branches shall become the property of the Association, with the understanding that they are not to be published in any other publication than those of the Association, except by consent of the Committee on Publication."—By-Laws, Chapter X, Art. III.

Reports of the meetings of the Local Branches should be mailed to the Editor on the day following the meeting, if possible. Minutes should be typewritten, with wide spaces between the lines. Care should be taken to give proper names correctly, and manuscript should be signed by the reporter. To maintain its activity and representation each branch should see that at least three of its meetings during the year are reported in the JOURNAL.

BALTIMORE.

The February meeting of the Baltimore Branch of the A. Ph.A. was held at the Emerson Hotel on February 28, 8.15 P.M.; Dr. Hermann Engelhardt presided.

The principal feature of the evening was the presentation of the slides showing the American Colleges of Pharmacy, prepared by Dr. Caswell A. Mayo. As the pictures were thrown on the screen they were explained by Dr. E. F. Kelly. The meeting was well attended, was much enjoyed, and the Secretary was directed to express to Dr. Mayo the thanks and appreciation of the Branch for the use of the slides.

The Branch reëlected the following officers for the present year:

President—Dr. Hermann Engelhardt, 2912 Garrison Ave., Baltimore.

Vice-President—John C. Krantz, Jr., Baltimore.

Secretary-Treasurer—B. Olive Cole, Greene & Lombard Sts., Baltimore.

Chairman Committee on Membership—Wilmer H. Schulze.

Chairman Committee on Professional Relations—Chas. L. Meyer.

Chairman Committee on Science and Practice of Pharmacy—Dr. Daniel Base.

Chairman Committee on Education and Legislation—Dr. E. F. Kelly.

B. OLIVE COLE, *Secretary-Treasurer.*

CHICAGO.

The 133rd meeting of the Chicago Branch of the American Pharmaceutical Association was held at the Hotel LaSalle Friday evening, February 25 at 8:00 o'clock with President Warren presiding.

The meeting was preceded by a dinner in honor of Dr. Henry H. Rusby of New York, the speaker of the evening. The attendance at the dinner and meeting was unusually large and included visitors from the Illinois Microscopical Society, from Indiana, and a number of cities in Illinois, outside of Chicago.

Dr. Rusby presented a most interesting and instructive lecture illustrated with many fine slides on his recent exploration trip to South America. While the lecture was popular in its nature and of interest to those not especially versed in pharmacy, it was also of great value to pharmacists and those familiar with drugs, because Dr. Rusby discussed and illustrated many drug plants. He also showed pictures of wonderful cacti, orchids and other interesting plants. The scientific and economic value of this great expedition has hardly begun to be realized. Dr. Rusby stated that some of the investigations of the new plant products already indicate important medical agents. As Mr. Warren stated, in discussing the lecture,—it will be many years before the full value of the scientific discoveries are known or utilized to their greatest economic extent.

Dr. Chas. F. Millspaugh, Botanical Curator of the Field Museum of Natural History, commented most favorably upon the lecture and stated that in the new South American exploration work was being undertaken by the Museum through the generosity of Captain Marshall Field, some of the unfinished

work of Dr. Rusby would be continued and it was hoped that further important results might accrue from this coördination.

Professor William B. Day offered, on behalf of the Chicago Branch, a hearty appreciation for this lecture and congratulations upon the splendid results achieved by the expedition.

Dr. Rusby acknowledged the fine generosity of the H. K. Mulford Company in financing the expedition. He stated that after the directors had voted money to meet the cost, they specifically required that every scientific and economic discovery should be published before it was communicated to the Mulford Company, and they refused to accept any remunerative or financial advantage from the discoveries of the expedition.

E. N. GATHERCOAL, *Secretary.*

CINCINNATI.

At the February meeting of the Cincinnati Branch of the American Pharmaceutical Association, Dr. Frank B. Cain made an address on affiliation of organizations, urging that steps be taken to bring about a closer coördination of the work of all the pharmacists in the city. He said that there was a great need of a closer affiliation of the pharmacists, something that would bring together those who are interested in education and professional pharmacy with those whose interests were centered in its commercial aspects. He spoke of the effective organization in the medical field and of the possibilities for good which might follow similar organization work in pharmacy. He complimented the Ohio Valley Druggists' Association upon the excellent service which it had rendered to the druggists of the community, and said he wanted it to be thoroughly understood that he did not in any way belittle that service, but he hoped that some plan might be worked out under which all the pharmacists of the city, whether commercially, educationally or professionally inclined, would be kept in touch with each other. The paper was discussed by Dr. Kennon Dunham, President of the Cincinnati Academy of Medicine, Otto J. Kohl, president of the Ohio Valley Druggists' Association, Harry Fricke, Business Manager of that organization, Henry Dustenberg, Frank H. Freericks, and others. President Fred Kisker appointed as a committee Dr. Cain, Mr. Kisker and Dr. Caswell A. Mayo to confer with a similar committee which the Ohio Valley Druggists' Association was asked to appoint with a view to bringing about a social affiliation between the two organizations as representing all phases of pharmacy.

On May 4 and 5, the Board of Trustees of the U. S. P. Revision Committee will meet in Cincinnati. Plans for entertainment are now being made by a joint committee of the Cincinnati Branch A. Ph. A. and the Ohio Valley Druggists' Association.

BERTHA OTT, *Secretary.*

DETROIT.

The February meeting of the Detroit Branch of the American Pharmaceutical Association was held at the Wayne County Medical Building, February 16. F. F. Ingram, Jr., presided in the absence of President Chas. H. Stocking.

Leonard A. Seltzer read a communication from General Secretary Wm. B. Day regarding the establishing of a permanent home for the A. Ph. A.

The speakers of the evening were A. O. Mathews, Research Department, Parke, Davis & Co., who gave an excellent discussion on "The Character of the Solution," and W. L. Irwin, manager Ampul & Hypodermic Department, read a paper on "Ampuls: the Container and its Contents." In presenting the latter subject, the speaker stated that "along with the many advances in the methods of treating disease, the practice of hypodermic and intravenous medication is receiving a great deal of attention among our leading physicians.

"These solutions are carried in the form of Ampuls—sealed glass containers, containing usually sufficient sterile solution for one dose."

After giving an historical account of the Ampul the speaker continued by saying that until about fifteen years ago in the United States physicians gave hypodermic injections only in emergencies. These consisted of the alkaloids, such as strychnine, morphine, etc. and were prepared from hypodermic tablets. From this time on, however, an entirely new field of hypodermic and intravenous medication has been gradually developing. Solutions of quinine, iron citrate, sodium cacodylate, and many other substances are now being very generally used.

Each type of Ampul, the speaker said, "presents its own peculiarities, and no general methods can be employed in their manufacture. Treatment that applies to one may completely ruin another.

"The quality of a finished ampul depends very largely upon the quality of glass used. It must by all means be clear and free from alkali.

Alkali will not only precipitate many substances from solution and cause loss in activity in others, but it will cause marked irritation at the point of injection."

Mr. Irwin then took up the details of preparing solutions and filling the ampuls, wherein the greatest care is absolutely essential.

"In the light of present knowledge," the speaker stated, "it is very desirable to avoid heat sterilization of all gland products. While we have no way of determining a loss of activity in many of these animal gland extracts, it is known that the hormones present are of a delicate nature, and the end products of their decomposition may be toxic.

"Pasteur filtration in all cases where heat is not applicable is indispensable. Aseptic handling under ideal conditions by specially trained help is also essential.

"The final and highly important step lies in the sterility tests of samples taken at frequent intervals throughout the filling operation. This part of the work must be handled by an experienced bacteriologist, and requires special equipment. It consists in incubating a sample of the solution with a suitable culture media for a period of five days. If, at that time, no growth is apparent approval is given. This is a real safety test, since very serious results may follow the injection of a contaminated solution into a vein or the tissues."

G. C. CHOSTNER, *Secretary.*

NEBRASKA.

The first meeting of the fiscal year of the Nebraska Branch of the American Pharmaceutical Association was held on the evening of November 8, at the College of Pharmacy, University of Nebraska. The program consisted of a brief report of the National conventions at Cleveland by Dr. R. A. Lyman, and an open discussion of the proposed plans of reorganization of the American Pharmaceutical Association, also conducted by Dr. Lyman. On account of rather poor attendance at the meeting, the election of officers of the Branch was postponed until the next meeting.

The second meeting of the Nebraska Branch of the American Pharmaceutical Association was held at Pharmacy Hall, University of Nebraska, on Tuesday evening, February 27. This was a joint meeting of the Nebraska Branch and the Nebraska Pharmaceutical Society, an organization of students of pharmacy of the University of Nebraska.

The program consisted of addresses by Mr. Guy Butler, of the Butler Drug Co., of Lincoln, and Dean R. A. Lyman, of the College of Pharmacy. E. O. Haschenburger, of the Koska Drug Co., and S. M. Wilson, of the Lincoln Pharmacy, were also invited to address the meeting but were unable to be present. The meeting was well attended and the addresses of the speakers were fully appreciated by the students and members present.

At the conclusion of the program, the election of officers of the Branch was held. The following officers were elected. *President*—S. M. Wilson; *Vice-president*—Guy Butler; *Secretary-Treasurer*—J. B. Burt. Dr. R. A. Lyman was elected as member of the Council to represent the Branch.

J. B. BURT, *Secretary-Treasurer.*

NORTH CAROLINA.

The regular February meeting of the University of North Carolina local branch of The American Pharmaceutical Association was held in the Assembly Room of the Pharmacy Building, Chapel Hill, No. 6, Friday evening, March 2, 1923. The speaker for the evening was Dr. Hubert A. Royster, Surgeon-in-Charge of Rex and Mary Elizabeth Hospitals, Raleigh, N. C.

Dr. Royster prefaced his address, "The Importance of Chemistry," by complimenting the students on the formation of the local branch of the American Pharmaceutical Association. He added that it was his belief that every one engaged in the practice of his profession should be affiliated with his National organization. Dr. Royster brought out the fact that most physicians and pharmacists seem to forget the fact that chemistry is one of the fundamental processes, as proven by the chemical changes which take place in breathing, digestion, and excretion. He appealed for a more extensive study of this science on the part of pharmacists. He also stressed the point that the ability to use your own language properly was essential in order to clearly express the results of your research, as knowing a fact without being able to publish it was of little value to the world.

ALMOND P. WESTBROOK, *Secretary-Treasurer.*

NORTHWESTERN.

The entire program of February 22, of convention in Minnesota, was devoted to a joint meeting between the Scientific and Practical Section of Minnesota Pharmaceutical Association and the Northwestern branch of the American Pharmaceutical Association. Dean F. J. Wulling presided. The following program was carried out, all but a few of the papers read in

full. The address by Dr. H. H. Rusby was especially appreciated, and was entertaining and instructive.

1. The College of Pharmacy of the University of Minnesota (Historical Annual)—F. J. Wulling.
2. Report Research Committee—C. H. Rogers.
3. Report Committee on U. S. P. and N. F.—E. L. Newcomb.
4. Report College of Pharmacy Committee—A. J. Kline.
5. My Ideal Pharmacy—G. J. DeMars.
6. Quality and Not Quantity—H. C. Kruckeberg.
7. The Manufacture and Sale of Your Own Preparations—J. B. Christgau.
8. Report on Drug Adulteration—G. Bachman.
9. The Retail Pharmacist of Yesterday and Today—M. Menzel.
10. Report of Committee on Drug Plant Culture—G. J. DeMars.
11. Organizing American Pharmacy—Second Paper—E. L. Newcomb.
12. What Pharmacy Needs—Richard Messing.
13. Investigation of a New Animal Fat—C. H. Rogers.
14. Report of Committee on Practical Pharmacy—F. A. U. Smith.
15. Elixir Iron, Quinine and Strychnine—M. B. Chittick.
16. Medicated Syrups—R. Bartleson.
17. Ethics of Pharmacy—H. M. Johnson.
18. The Man Who Guards Our Drugs—E. E. Stanford.
19. Should Students Be Selected?—F. J. Wulling.
20. Observations of Practical Value on Digitalis Dispensing—E. L. Newcomb.
21. The Number of Drug Stores Should Be Restricted—F. J. Wulling.
22. A Pre-pharmaceutic academic college year—F. J. Wulling.
23. Professional Progress in South Dakota During Last Five Years—Antln Hogstad, Jr.
24. An Address by Dean Rusby of the Columbia University College of Pharmacy.

PHILADELPHIA.

The regular monthly business meeting of the Philadelphia Branch of the American Pharmaceutical Association was held Tuesday evening March 13th, at the Philadelphia College of Pharmacy and Science.

The meeting was called to order by President Jenkins. Secretary Jos. W. E. Harrisson read the minutes of the previous meeting, which were approved.

The following applications for membership in the local branch and also the parent organization were presented.

Chas. E. Mullin, 3rd and Jackson St., Camden, N. J.; H. Morton Cameron, 5400 Germantown Ave., Philadelphia; John Thomas Fenton, 410 East Center St., Mahoney City, Pa.; John A. Pierro, 1317 South 6th St., Philadelphia.

The applicants were elected.

The Committee on nominations, composed of Charles H. LaWall, E. Fullerton Cook and E. G. Eberle, presented the names of the following nominees:

President, Robert C. White; *First Vice-President,* H. Morton Cameron; *Second Vice-President,* Louis Gershenfeld; *Secretary-Treasurer,* Joseph W. E. Harrisson.

Committees—*Membership:* W. W. McNeary, Chairman; Leo C. Penn and Edward T. Hahn. *Fraternal Relations:* Dr. H. C. Wood, Chairman, Dr. F. E. Stewart, J. K. Thum. *Practical Pharmacy:* Adley B. Nichols, Chairman, Karl Ehmann, Quintus Hoch.

The nominees were elected.

The committee on nominations also presented an amendment to the By-Laws of the Local Branch so that they should read as follows.

"The President shall have the power to appoint the chairman and members of the several standing committees."

President Jenkins then introduced the President-elect who assumed charge of the meeting. He introduced Mr. Geo. C. Friend, of Wilson and Company, as the speaker of the evening; his topic was "Endocrines and Packing House By-Products." A very complete line of these products was exhibited.

Mr. Friend emphasized that the average man encountered by-products of the packing house industries at every turn, if not directly they were used in the manufacture of the various impliments and articles which he used. He spoke of the endocrines which are coming rapidly into favor among physicians and the many uses to which they were put. He illustrated by charts the parts of the animals from which they were obtained.

Mr. Hunsberger in discussing the subject suggested that the manufacturers of these products should print on the labels a notice that

they rapidly deteriorated, unless kept under favorable conditions.

A vote of thanks was extended to the guest of the evening and also to the retiring officers of the Branch.

Charles H. LaWall suggested the appointment of a committee to look after the proposed state regulations of laboratories doing clinical work. The following members were appointed: *Chairman*, Ambrose Hunsberger; W. L. Cliffe and Dr. John R. Minehart.

Jos. W. E. HARRISSON, *Secretary.*

PITTSBURGH.

The Pittsburgh Branch of the American Pharmaceutical Association has been holding very interesting and instructive meetings recently which have been given over largely to matters of commercial information of value to its members, especially those engaged in the retail drug business. C. Leonard O'Connell gave a talk on selling bristle goods, which was followed by a discussion during which many valuable suggestions were brought out. Glen Boyer, a student of the School of Pharmacy, read a paper on the subject of Chinese Wood Oil and its uses which also provoked a thorough discussion. Dr. E. C. Reif gave a very instructive talk on Vitamines, in which he presented a comprehensive review of important facts brought out in the literature on the subject, which proved extremely interesting and instructive.

At the January meeting the annual election took place with the following result: *President*, Edward C. Nied; *Vice-President*, I. Paul Griggs; *Secretary*, B. E. Pritchard; *Treasurer*, P. Henry Utech; *Member of Council*, A. Ph. A., Julius A. Koch. An interesting feature was presented in a paper by Joseph Cohen, a College of Pharmacy student, on the manufacture of aluminum utensils, which was discussed in all of its phases by J. A. Koch, Louis Saalbach, A. F. Judd and J. H. Wurdack.

At the February meeting the new president, Edward C. Nied, was formally introduced by Dr. E. C. Reif, and he made an inauguration address in which he expressed satisfaction upon the presence of so many of the student body. Vice-President I. Paul Griggs also spoke in a modest manner at being honored in his election.

The Secretary read a letter from Dr. Caswell A. Mayo concerning our disappointment at not receiving the interesting slides which failed to reach us in time for our meeting due to the delay in shipments that have been experienced by all shippers during the embargo. Dr. Mayo wrote "If you should think it worth while to try again I shall endeavor to make a date for you sufficiently far in advance to make sure that there will be no possibility of delay." On motion the Secretary was instructed to request that we be favored with this interesting set of slides for our meeting to be held the third Tuesday in April. Dr. Beal's appeal for subscriptions to the building fund for the headquarters for the American Pharmaceutical Association was read by Dr. Koch who urged upon those present to make such contributions as their means would permit, be it ever so small. The Secretary directed attention to the fact that a number of members of the parent body had neglected to forward their annual dues for 1922 and he had been requested by the Treasurer to bring this matter before our members for attention. The feature of the program was a talk accompanied by blackboard diagrams on "The Principles Involved in the Wassermann Reaction" by Dr. E. C. Reif, a member of the College faculty. Discussion was participated in by Dr. Judd, C. Leonard O'Connell and others.

B. E. PRITCHARD, *Secretary.*

AN OPPORTUNITY TO MARKET A RAT POISON IN JAPAN.

James F. Abbott, U. S. Commercial Attaché at Tokio, states that an effective poison for killing rats is desired in Japan. The preparation must be comparatively harmless for human beings. Rats are feared in Japan as carriers of plague and are a great pest. A poison largely sold in Japan contains phosphorus as the toxic element; the objection to it is that about 5000 persons committed suicide last year by means of it ("neko-irazu").

Another Japanese news item conveys the information that a rich quicksilver vein has been discovered in the upper Goto Archipelago of Japan. The width of the vein is said to be from 2 to 6 feet and extends for over seven miles.

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Ztschr. anal. Chem., 61 (1922), 457, through *Chem. Zentralbl.*, 94, part 2, (Jan. 24, 1923), 160

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Ztschr. angew. Chem., 1922, No. 88, through *Pharm. Ztg.*, 68 (Feb. 21, 1923), 145

Auerbach, F. and Zeglin, H.

Gravimetric determination of formic acid

Ztschr. physik. Chem., 103 (1922), 161, through *J. Soc. Chem. Ind.*, 42 (Feb. 23, 1923), 161A

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J. Am. Chem. Soc., 45 (Mar. 1923), 800

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Kearns, M. Lucretia, Heiser, L., and Nieuwland, J. A.

Oxalic acid from acetylene

J. Am Chem. Soc., 45 (Mar. 1923), 795

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Iodometric determination of antipyrine

Pharm. Weekbl., 60 (Feb. 17, 1923), 194

Kolthoff, I. M.

Colorimetric determination of water in absolute alcohol

Pharm. Weekbl., 60 (Feb. 24, 1923), 227

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J. Am. Chem. Soc., 45 (Mar. 1923), 757

Lockemann, Georg

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Desinfektion, 7 (1922), 32, through *Chem. Zentralbl.*, 94, part 2 (Feb. 7, 1923), 374

Macbeth, Alexander K.

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Chem. News, 125 (1922), 305, through *J. Chem. Soc. Lond.*, 124 (Jan. 1923), part 2, 34

Masucci, Peter and Moffat, Margaret I.

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J. Am. Pharm. Assoc., 12 (Feb. 1923), 117

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J. Am. Pharm. Assoc., 12 (Feb. 1923), 115

Noyes, William A.

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J. Am. Chem. Soc., 45 (Mar. 1923), 857

Palme, Herman

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Svensk farm. Tidskr., 27 (Feb. 28, 1923), 85

Scheringa, K.

Sensitive test for neosalvarsan

Pharm. Weekbl., 60 (March 3, 1923), 248

Tillmans, J. and Kruger, A.

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Ztschr. angew. Chem., 35 (1922), 686, through *J. Chem. Soc. Lond.* 124 (Jan. 1923), part 2, 36

Van Itallie, L.

Microchemical detection of fumaric acid

Pharm. Weeekbl., 59 (Dec. 9, 1922), 1312

Venable, Chas. S.

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Condorelli, Luigi

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Rif. med., 38 (1922), 746, through *Chem. Zentralbl.*, 94, part 2 (Feb. 14, 1923), 283

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Colorimetric determination of uric acid

Compt. rend. soc. biol., 87, 291, through *Chem. Zentralbl.*, 94, part 2 (Feb. 7, 1923), 298

COUNCIL BUSINESS

A. PH. A. COUNCIL LETTER NO. 10.

WASHINGTON, D. C., March 10, 1923.

To the Members of the Council:

55. Motion to hold first official conference of the Executive Committees of the A. Ph. A. and N. A. R. D. at Asheville. Carried.

56. Further comment on status of committee to represent pharmaceutical interests in the Division of Biology and Agriculture of the National Research Council (See Items 21, 32 and 53). Under date of February 5, 1923, Professor Wulling writes from Minneapolis as follows:

> "Referring to paragraph 53, Council Letter No. 9, let me say that I feel that Pharmacy ought to be represented in the Division of Biology and Agriculture of the National Research Council by more than A Committee on Coöperation and I suggest that efforts be continued to obtain for Pharmacy a more adequate representation in the N.R.C."

57. Applicants Nos. 166 to 199 elected to active membership.

58. Election of active members: No. 200, A. John Schwarz, 1846 Cross Drive, Woodruff Place, Indianapolis, Ind.; No. 201, Ferdinand A. Mueller, Sr., 459 E. Washington St., Indianapolis, Ind.; No. 203, Hugo J. Enenbach, 333 W. Center, Pocatello, Idaho; No. 204, Lucius L. Wilson, 437 East 60th St., Chicago, Ill.; No. 205, David Walter Cremevius, 2631 Burling St., Chicago, Ill.; No. 206, John Gilman Ritter, 754 N. Wells St., Chicago, Ill.; No. 207, John Charles Stokes, Jr., 5437 S. Dearborn St., Chicago, Ill.; No. 208, Mandel Herman, 1540 E. 65th Pl., Chicago, Ill.; No. 209, Ruth Lucile Dickey, 1530 N. Illinois St., Apt. 45, Indianapolis, Ind.; No. 210, Max S. Miller, 21 Mass. Ave., Boston, Mass.; No. 211, Mathias William Duffy, 9119 Exchange Ave., Chicago, Ill.; No. 212, Howard F. Gilbride, 394 Essex St., Lynn, Mass. No. 213, Joseph Nathan Meyers, 1033 Blue Hill Ave., Dorchester, Mass.; No. 214, Moritz Adolf Dittmar, 774 Bergenline Ave., West New York, N. J.; No. 215, Varnum Ober Pedrick, 37 Merrimac St., Haverhill, Mass.; No. 216, Louis Jacob Mandell, 43 Thornton St., Revere, Mass.; No. 217, William Vincent Benny, 106 E. Rose Street, Pittsburgh, Kans.; No. 218, C. Leonard O'Connell, Shady & Oxford Sts., Crafton, Pittsburgh, Pa.; No. 219, John Bernhardt Egner, 1550 Hanover St., Baltimore, Md.; No. 220, J. C. Schutz, Madison, S. Dak.; No. 221, Roy Henry Clark, 3917 A Wyoming St., St. Louis, Mo.; No. 222, John Austin Roberts, 3815 Kate Ave., Baltimore, Md.; No. 223, Arthur Dean Pochert, R. 4, Box 353-A., Tacoma, Wash.; No. 224, Eldin Verne Lynn, 4244—11th Ave., N. E., Seattle, Wash.; No. 225, Warren Lee Stroud, 4522—15th Ave., N. E., Seattle, Wash.; No. 226, Bertha Love McFee, 4534—17th Ave., N. E., Seattle, Wash.; No. 227, Eugene Frank Galeno, 7036—6th St., N., Seattle, Wash.; No. 228, Herbert Fred Neubauer, 4547—17th Ave., N. E., Seattle, Wash.; No. 229, Violet Maxine Wise, 819 North 5th St., Apt. 3A, Tacoma, Wash.; No. 230, Ruth Magdalene Davis, 2759 Broadway, Bellingham, Wash.; No. 231, Marie Beatrice Nyguist, 1023 E. 62nd St., Seattle, Wash.; No. 232, Angelo Vespasiano, 114 Common St., Lawrence, Mass.; No. 233, Henry Hugh Bousquet, 307 Hancock St., So. Braintree, Mass.; No. 234, Everett Sydney Shaw, 352 Washington St., Braintree, Mass.; No. 235, John Robert Brickley, 468 College Ave., Valparaiso, Ind.; No. 236, Wilbur E. Foster, 802 Mound St., Valparaiso, Ind.; No. 237, Jonas G. Kazloushas, 751 Cyrus St., Valparaiso, Ind.; No. 238, Robert Abraham Goodless, 113 Massasoit St., Springfield, Mass.; No. 239, Leonard Rhodes, 2718 East 54 St., Seattle, Wash.; No. 240, Helen Eheim, 525 North 83rd St., Seattle, Wash.; No. 241, Omega Hilton, 2215 E. 46th St., Seattle, Wash.; No. 242, Paul B. Edelstein, 1111 Independence Blvd., Chicago, Ill.; No. 243, Charles Dunton Higley, 309 Orange St., Syracuse, N. Y.; No. 244, Charles Ferdinand Mraz, 1515 S. Austin Blvd., Cicero, Ill.; No. 245, Rebecca Lutwak, 83 Blossom St., Chelsea, Mass.; No. 246, William M. Gould, 2740 E. Baltimore St., Baltimore, Md.; No. 247, Neil Norton Hilton, 921 N. Laramie Ave., Chicago, Ill.; No. 248, Edward Chris-

toph Nied, 541 E. Ohio St., N. S., Pittsburgh, Pa.; No. 249, Thomas Farrell Franklin, c/o D. Y. Butcher Drug Co., Colorado Springs, Colo.; No. 250, Benjamin Maller, 931 S. Winchester Ave., Chicago, Ill.; No. 251, Sara Krane, 5744 Stony Island Ave., Chicago, Ill.; No. 252, Vernon Thomas McMahon, 17 N. Genessu St., Waukegan, Ill.; No. 253, Leo E. Gergen, 1014 Race St., Shamokin, Pa.; No. 254, Alvarez Joseph La Certe, 423 Commercial St., Emporia, Kans.; No. 255, Lida Luelle Winkelblech, 5603 Julian Ave., Indianapolis, Ind.; No. 256, Lilburn E. Grayson, 1118 N. Morent St., Indianapolis, Ind.; No. 257, Felix Mendex, 310 N. Illinois St., Indianapolis, Ind.; No. 258, Belle Wenz, 614 Campus Ave., Pullman, Wash.; No. 259, James Daniel Miller, 1405 N. 2nd St., Philadelphia, Pa.; No. 260, John L. Thinnes, 3222 Harrison Ave., Cincinnati, Ohio; No. 261, Morris Travis, 534 West Court House, Cincinnati, Ohio; No. 262, John Wilson Preston, 1250 Gerrard St., E., Toronto, Canada; No. 263, Harry G. Aument, 7269 Jefferson Ave., E., Detroit, Mich.; No. 264, Harry Reisman, 5525 St. Antoine, Detroit, Mich.; No. 265, Ju-Chiang, Liu, 3262 Sansom St., Philadelphia, Pa.; No. 266, John Driscoll Conaty, 1603 Hall St., East St. Louis, Ill.; No. 267, Horace Roland Harper, 4732—16th Ave., N. E., Seattle, Wash. No. 268, Ernest D. Whiteley, 354—77th Ave.; N. E., Seattle, Wash.; No. 269, Harold Walford Silke, 4230 University Way, Seattle, Wash.; No. 270, Dale H. Garron, 1209 American Bank Bldg., Seattle, Wash.; No. 271, Permillas Arten Lee, 303 South Wilson Ave., Dunn, N. Car.; No. 272, Edward Howard Brown, 299 Young St., Winnipeg, Manitoba, Canada; No. 273, Paul L. Thompson, 145 No. 33rd St., Lincoln, Nebr.

A. G. DuMez, *Secretary.*

Committee Reports

THE NEED FOR A MORE THOROUGH ORGANIZATION OF AMERICAN PHARMACY*

A COMMUNICATION ADDRESSED TO STATE PHARMACEUTICAL ASSOCIATIONS BY THE HOUSE OF DELEGATES, A. PH. A.

While there were a few local and even state associations of pharmacists in this country prior to 1851 when the American Pharmaceutical Association was founded, yet that year marks the real beginning of pharmaceutical organization in the United States. The impetus given by the American Pharmaceutical Association resulted in the development of the State pharmaceutical associations, who are in this sense, children of the A. Ph. A., and the same spirit later gave rise to the several national organizations who are so well serving the various interests of pharmacy. But while this development of associations representing the different groups was most necessary yet the need for coördinating them into a closer federation is increasingly apparent. In the effort to bring about such a federation there is no thought of antagonizing, much less of replacing, and existing organization but rather of increasing their efficiency through a closer union. With the national organizations, an excellent start has been made in the Drug Trade Conference—which has already accomplished much for pharmacy. But to unite especially the state associations and to bring them into closer touch with the parent body is an immediate and urgent need.

Those who had the privilege and opportunity to look in upon some of the leaders of American pharmacy when they were considering this question at the Cleveland meeting of the A. Ph. A. held last August realize that the whole problem of pharmaceutical organization is being given more serious thought than ever before. There sat delegates representing every possible complexion of pharmaceutic activity. Crude-drug importers and producers, manufacturers, wholesalers, retail pharmacists, commercial and professional men, pharmaceutical journalists, everybody, every interest was represented.

These men, realizing that positive action looking toward the building up of a great federation of pharmaceutical associations was necessary, did something which never before has been done in the history of American pharmacy. They adopted and directed to be placed before the pharmacists of America a plan for a comprehensive and yet effective organization. They now ask that

* Further information on the subject will be gladly given by Secretary William B. Day, 701 So. Wood St. Chicago, Ill.

the great body of American pharmacists as represented by the State pharmaceutical associations approve the plans for organization as outlined.

The plans are the result of continued and serious study by a group of our most able men. They are not held to be perfect. No plan ever is. They represent the best that can be produced preliminary to actual use. The pharmaceutic world is now waiting for the druggists of the country through their respective state associations to speak; awaiting for the druggists of the United States to say "YES —we approve the plans and urge that no effort be spared or time lost in bringing about the proper adjustment of by-laws, etc., so that the actual work of organizing may be started; so that the serious problems which are becoming an increasing menace to the very life of pharmacy may be adequately and equitably solved in the interests of the entire pharmaceutic body and the public."

This appeal for approval comes not from a small group representing a certain phase of the pharmaceutical activity of the country, but rather from a united group representing *every* branch of pharmacy. It is backed by officers and delegates from practically every drug organization in the country. All were present at the Cleveland conference. The officers and executive committeemen of the N. A. R. D. and A. Ph. A., representatives of all branches of the manufacturing industry relating to drugs and allied products, delegates from state associations, boards of pharmacy, wholesalers, scientists, government officials and others.

Now comes the official request through the officers of the American Pharmaceutical Association that the rank and file of pharmacists of the country through their state associations approve the plans. This is as it should be. The A. Ph. A. is the only existing organization to which *all* having any interest in the drug business are eligible for membership. The retail pharmacists of the country, some 50,000 of them, represent the largest single group having a vital interest in drugs.

It is to be hoped that these state associations as they meet one after another during the coming six months will approve these plans for a real national federation of pharmacy with votes that can be heard from coast to coast and from Canada to the Gulf of Mexico.

The opportunity is now here and every pharmacist should attend his State meeting with the one thought uppermost in his mind of putting his state solidly back of the big task to be accomplished. No funds are required or asked to be pledged. The one question is are you ready to *organize?* We have yet to find a pharmacist who is a "Doubting Thomas."

When your state association officers present this subject put it across with a bang! And let's help American Pharmacy on the road to recognition and prosperity.*

NATIONAL COMMITTEE ON THE PHARMACEUTICAL SYLLABUS.

BULLETIN XXXII.

Chicago, Ill., Aug. 8, 1922.

To the Members of the National Committee on the Pharmaceutical Syllabus: Committee Reports.

I hand you herewith the financial statement of the Committee for the period Sept. 1, 1921 to August 8, 1922.

1921	Receipts		1921	Disbursements	
Sept. 1	Cash on hand	$487.68	Dec. 22	300-1 c. stamps	$ 3.00
Nov. 1	Natl. Assoc. Boards Pharmacy	25.00	1922		
			Jan. 18	Exchange	.15
7	Am. Conf. Pharm. Faculties	25.00	May 16	T. J. Bradley, postage	8.00
7	Am. Pharm. Association	25.00	Aug. 1	Exchange	.10
	9 copies 2nd edition Syllabus	11.32	Aug. 8	Cash on hand	618.50
	36 copies 3rd edition Syllabus	55.75			$629.75
		$629.75			

I have on hand about 90 copies of the 2nd edition of the Syllabus. Two hundred twenty-five copies of the 3rd edition of the Syllabus have been sold and payment for the same received.

Respectfully,

Clyde M. Snow, *Secretary-Treasurer.*

Examined and found correct August 1922.

Theodore J. Bradley, *Chairman.*

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* See also pp. 291 and 364.

BULLETIN XXXIII.

The third edition of the *Pharmaceutical Syllabus* was issued during October, 1922, was copyrighted in the name of the Pharmaceutical Syllabus Committee, and is being sold at $2.00 per copy by the Secretary-Treasurer of the Committee, Prof. Clyde M. Snow, 701 South Wood Street, Chicago, Illinois. The bill for making the 1200 copies of the third edition amounted to $1480, of which $680 was paid in cash from the treasury and $800 was paid by a note with the personal endorsement of the Chairman. Payment of the balance was made in this way because the account had run for about three years, while the *Syllabus* was being revised, and it did not seem reasonable to ask the printer to wait for settlement until enough copies of the book are sold to pay the entire bill. When the note becomes due in June, it will be paid in full or reduced in amount.

The only change in membership during the past year was the election of Mathias Noll of Atchison, Kansas, by the National Association of Boards of Pharmacy for the 1922–1929 term, in place of Charles S. Koon of Muskegon, Michigan, whose term had expired. George M. Beringer and Theodore J. Bradley have been appointed to succeed themselves, by the American Pharmaceutical Association and the American Conference of Pharmaceutical Faculties, respectively.

Requests have been received for a rearranged program of studies for the three-year course which, beginning in 1925, is to take the place of the present two-year course leading to the degree of Graduate in Pharmacy. As this longer course has been agreed upon by the American Conference of Pharmaceutical Faculties because the subjects included could not be taught in the two-year course, it is obvious that an increase in the total number of hours of instruction is called for and the Chairman suggests that the three-year course should include a minimum of six hundred hours of instruction in each year, or a minimum total of eighteen hundred hours for the three years, compared with the twelve hundred hours of the present two-year course.

There have also been some reasonable objections to the present equal division of hours between the three departments of study, namely, materia medica, chemistry and pharmacy. It is claimed by some that this equal division of time is mechanical and that pharmacy should have proportionally more time allotted to it. To bring these matters before the Committee, the Chairman suggests the following division of the total time between the three departments.

Materia Medica	500 hours
Chemistry	600 hours
Pharmacy	700 hours
Total in three-year course	1800 hours

In considering this proposal, it should be remembered that these are minimum numbers of hours of instruction and that any school can exceed one or all of them if it desires to.

Members of the Committee are requested to send their views on the above questions to the Chairman, at an early date, to help in the formulation of questions to be voted on later.

Theodore J. Bradley, *Chairman.*

NEW YORK BOARD OF TRADE DRUG-CHEMICAL SECTION DISCUSSES LEGISLATIVE MATTERS.

At the recent meeting of above named section of New York Board of Trade legislative matters were discussed. Attention was called to the Twomey bill requiring that every pharmacy shall be owned by a licensed druggist, with the professed purpose of preventing liquor dealers from pursuing their nefarious trade under the guise of druggists.

Other matters reported by the committee were:—(1) A bill has been introduced by Senator Duke of Alleghany forbidding the sale of alpha or beta eucaine, or cocaine, except on a prescription, and requiring the use of the word "Poison" on the wholesaler's package; (2) Assemblyman Bloch has proposed a fine of $100, or a year in prison, as punishment for anyone manufacturing or selling heroin or any compound thereof; (3) the bill introduced by Assemblyman Hamill prohibiting the sale of opium shall not apply to wholesalers who are permitted by law to deal in such goods. The resolution introduced by Congressman Potter, requesting the President to call a conference of nations to discuss limiting the production of poppy and other plants from which narcotics can be made, has been passed by Congress and signed by the President; the bill to reduce the narcotic tax on physicians, manufacturers and dealers, introduced by Congressman Kindred, and another by Senator Ladd, forbidding the manufacture of heroin, were not reported to Congress.

EDITORIAL NOTES

Editor: E. G. EBERLE, Bourse Building, Philadelphia, Pa.

Committee on Publication: A. G. DUMEZ, *Chairman;* S. L. HILTON, H. M. WHELPLEY, R. A. LYMAN, W. L. SCOVILLE, and the Editor-in-Chief of the JOURNAL, General Secretary, Treasurer and Reporter on the Progress of Pharmacy, *ex-officio.*

Collaborators: JULIUS A. KOCH, President, A. Ph. A.; CHARLES H. LAWALL, President, A. C. P. F.; EDWARD WALSDORF, President, N. A. B. P.; E. FULLERTON COOK, Chairman, U. S. P. Revision Committee; W. L. SCOVILLE, Chairman N. F. Revision Committee; S. L. HILTON, Chairman, Council A. Ph. A. The Chairmen of the Sections, A. Ph. A.: ARNO VIEHOEVER, CROSBY B. WASHBURNE, W. F. GIDLEY, WALTER M. CHASE, CLYDE L. EDDY; E. F. KELLY and WILLIAM B. DAY of the House of Delegates; A. G. DUMEZ, Secretary of the Council, the General Secretary, and the Reporter on the Progress of Pharmacy.

STUDIES OF VITAMINS.

At a recent meeting of the Royal Institute of Great Britain, Dr. Arthur Harden presented a summary of present knowledge on the question of vitamins. Dr. Henry Leffmann has abstracted the report for the March number of the *Journal of the Franklin Institute,* as follows:

Experiments on these substances are difficult and tedious. It seems to be established that vitamins A and C are fairly resistant to moderate increase of temperature provided air is excluded, but deteriorate rapidly when exposed to oxidation. Vitamin B is less affected by heat and aeration. All three vitamins originate in the vegetable kingdom, and in view of this fact, it is interesting to recall the Biblical endorsement of the "green herb for meat" as given to the residents of Gan-Eden. In fats, the vitamin seems to reside entirely in the unsaponifiable portion, and as this usually consists largely of cholesterol, which has no value, it is evident that the amount of the really active substance is very minute. Vitamin A does not appear until the photosynthetic actions occur. Vitamin C is not in seeds, but appears when they germinate and before any green parts are formed. The conditions under which vitamin B is produced are still somewhat uncertain, but its existence in yeast shows that it may be produced without action of light. Milk from stall-fed animals is poor in A and also likely to be deficient in C. The comparatively enormous amount of A in cod-liver oil has been one of the most striking results of recent investigations, but in connection with these data the fact that liberal exposure to sunlight will often counteract certain dietetic deficiencies must not be overlooked. It must not be forgotten that most of these feeding experiments are conducted in laboratories not open freely to sunshine and that the animals are under decidedly unnatural conditions in some ways.

Testing of Foodstuffs for Vitamins is described by J. C. Drummond and A. F. Watson, of University College, London (*Analyst,* 1922, xlvii, 235–246). Physical and chemical methods do not exist for the detection and determination of the vitamins, so they must be studied by the biological method, *i. e.,* their action on animals. Fat soluble A, which promotes growth and prevents the eye disease known as xerophthalmia, accompanies the unsaponifiable fraction of a fat, provided the latter be isolated under conditions which exclude oxidation. A daily dose of approximately 0.01 milligram of this vitamin, as it occurs in cod-liver oil, is sufficient to produce nearly normal growth in an albino rat. The traces of this vitamin, which occur in casein, are destroyed if that protein be spread out in thin layers and be exposed for several hours to a temperature of 110° C. in a current of air. In testing for water soluble B, determination of the growth curve of the rat is preferred to determination of the curative effect on a polyneurotic pigeon. Commercial yeast extracts are especially rich in this vitamin. In the past, food control officials have tested meat extracts for adulteration with yeast extract; in the future, they probably will have to combat adulteration of the vitamin-rich yeast extracts, with less potent materials. In testing for the antiscorbutic vitamin, water soluble C, use is made of the guinea-pig. Lemon juice is a far more potent antiscorbutic than lime juice.

J. S. H.

PERSONAL AND NEWS ITEMS.

Chairman E. Fullerton Cook, of the U. S. P. Revision Committee, announces that reprints of the first abstract of proposed changes for the U. S. P. X. (See JOURNAL A. PH. A., pp. 57–73, January 1923) may be obtained by addressing him at 636 South Franklin Square, Philadelphia. The Committee of Revision invites comments or criticisms at this time, that the maximum degree of perfection may be attained in the revision.

The Chemist and Druggist (Great Britain) of February 24, 1923, comments on the changes and summarizes various alterations. We quote in part:

"The first impression is that the 'tried and trusted' remedial agents are to undergo little or no change in specification. Secondly, there is an endeavor to eliminate points where individual opinion might vary. Thus quantitative turbidometric tests for chlorides and sulphates are to replace the former statements respecting these of 'not more than slightly turbid or slightly opalescent.' The difficulty of remaining consistent is shown by the case of pilocarpine nitrate and sodium diethylbarbiturate (new) where the term 'an opalescence' is reintroduced in the test for 'chloride,' and 'turbidity' in sulphate test for latter. Increasing regard for limits of impurity is evident in several ways, *e. g.*, in melting point limits, new or reduced ash limits, non-volatile matter in volatile compounds, tests for readily carbonizable substances, tests for acidity in alkaloidal salts, and limits for free acids in vegetable oils. Again, after specifying exactly such limitations, a lapse occurs in some ash limits as negligible. The suggestion of therapeutics in connection with pepsin is removed by deletion of reference to incompatibility with alkalies and activity in dilute hydrochloric acid solutions. On the other hand, a dispensing note is added to phenol—'When phenol is to be mixed with collodion, fixed oils, or petrolatum, use melted crystalline phenol instead of liquid phenol.' Another curiosity is the deliberate omission in some instances of descriptions of 'taste.' It is not stated whether this is due to grave danger arising out of this procedure in the case of poisons or to such test in other cases being individual in character. One also wonders why a poison warning is added to aconitine and removed from mercury perchloride. Quite a number of new identity tests are added, and assay processes included for such preparations as caffein, sodio-benzoas, which may vary in composition. A concession to purity of principle, irrespective of whether source is natural or artificial, is reflected in the omission of definition of source in several instances."

Dr. Zdenek F. Klan, in charge of food and drug inspection in the new republic of Czechoslovakia, has written to Secretary A. G. DuMez, expressing appreciation of the JOURNAL A. PH. A., and has sent copies of the Chemical Journal and Pharmaceutical Journal of his country. Dr. Klan is a Rockefeller Foundation Fellow of the Hygienic Institute of Prague, and studied in this country. It will be remembered that sets of A. Ph. A. Year Books and Proceedings were donated to the latter institution, last year.

Dean Henry Hurd Rusby of the College of Pharmacy, Columbia University will receive the 1923 Remington Honor Medal at a banquet to be given on April 16th at the Pennsylvania Hotel, New York City. Previous awards of the medal have been to Professor James H. Beal, John Uri Lloyd and Dr. H. V. Arny. The medal is awarded annually by a committee consisting of the past presidents of the American Pharmaceutical Association, Professor Hugo H. Schaefer, of the New York Branch, A. Ph. A., acting as secretary for this committee. Dr. Jacob Diner, the senior past president of the branch, will make the award. Phases of Dean Rusby's activities which resulted in the award of the medal will be related by speakers who have been in close contact with the recipient of the medal during his years of valuable service to American pharmacy.

L. L. Shull, retail druggist of Sharpesville, Ind., and member of the Indiana Legislature, has been successful in the promotion and passing of all measures advocated by the Legislative Committee of the Indiana Pharmaceutical Association. Mr. Shull graduated from Valparaiso College of Pharmacy in 1905. He was a member of the House Health Committee and in that capacity rendered valuable service.

Dean Frederick J. Wulling, in a letter to the JOURNAL, states that few people elsewhere realize how successful and largely attended were the meetings of the Minnesota Pharmaceutical Association. The total registration was over 1300, and between 600 and 700 were present at an illustrated lecture on the Colleges of Pharmacy of the United States given by him. The drug exhibition held during the convention was a popular success; it is said that over 50,000 visitors were in attendance during the week.

Prof. Julius Stieglitz, of the University of Chicago and well known to pharmacists, has been awarded the Willard Gibbs Medal by the Chicago Section of the American Chemical Society for his researches in organic chemistry. The medal will be presented in May.

Prof. Hugo H. Schaefer, of the College of Pharmacy, Columbia University, and Secretary of the New York Branch, A. Ph. A., will go to Switzerland some time during this month for the purpose of continuing his studies at the Pharmaceutical Institute in Bern, where our Honorary Member Professor Dr. Alexander Tschirch presides.

O. L. Biebinger, General Manager of the Mallinckrodt Chemical Works, with his wife and daughter, has gone to Europe on a visit to continue several months. They will visit in France, Italy and Switzerland.

Capt. N. Fujita, a chemist in the Medical Supply Department of the Japanese Army, is in this country making a survey of the pharmaceutical industries of the United States for the information of his government.

Dr. A. R. L. Dohme is among those prominently mentioned in Baltimore as a candidate for President of the City Council.

Dean L. E. Sayre, of University of Kansas, School of Pharmacy, was in attendance at the meeting of the Joint Committee of Definitions and Standards held at the Bureau of Chemistry, March 12th to 16th. The Dean is a member of this Committee.

Dr. Paul S. Pittenger lectured at Western Reserve University and New Jersey College of Pharmacy recently. The lectures were illustrated by charts and by demonstrations requiring animals; in the latter, he demonstrated how by the effect on a dog the ten millionth part of an ounce to epinephrine can be determined, on a guinea pig the ten thousandth part of an ounce of pituitary extract, and a rooster, will weigh the thousandth part of an ounce of ergot; *i. e.*, the effect of that dose of ergot can be shown.

Dean Willis G. Gregory, of the Buffalo College of Pharmacy, was a guest of Secretary Robert S. Lehman at the luncheon of the New York Veteran Druggists' Association, on March 6th. The talks after the meeting related to early experiences in the drug store, and the Dean most interestingly responded to the subject.

William H. Glover is President of the Lawrence (Mass.) Retail Druggists Association.

Ex-President John G. Godding, of the American Pharmaceutical Association, is sketched in the February number of the *Boston Masonic Club Bulletin*. He is a past Master of his Lodge, and active in other Masonic bodies of his home city. He has been treasurer of the Massachusetts College of Pharmacy since 1889.

Simon Rau and Company of Bethlehem, Pa., contend for honors in early pharmaceutical history of this country; the store, in which they are successors, was a busy pharmacy in 1752.

Prof. Charles H. LaWall was the lecturer at the Philadelphia College of Pharmacy and Science, in the course of popular lectures. His subject was "The Romance of Spices." He spoke of the great discoveries of the 13th and 18th Century as largely the result of search for spices and drugs. These lectures are now broad casted.

George H. Grommet of Detroit, President of the Michigan State Pharmaceutical Association has been instrumental in having an insurance law passed, in Michigan, which will materially reduce the insurance rates of drug stores.

The fifty-year service of Herman Sattler was celebrated by Sharp and Dohme by a dinner given in his honor and attended by the officials and others of the firm.

Dr. Emanuel August Merck, of the German chemical firm of E. Merck, died February 26th. Mr. Merck was the owner of the historic Angel Pharmacy founded in 1668, in the laboratory of which the first production of alkaloids by the grandfather of the deceased was undertaken on a large scale, a century or more ago.

Dr. Edward W. Morley, for 37 years Professor of Chemistry at Western Reserve University, Cleveland, died at his home in Hartford, Conn., February 24th. He was an ex-president of both the American Association for the Advancement of Science, and the American Chemical Society.

Sir James Dewar, noted scientist of Great Britain, died March 27th. He is known in connection with smokeless powder, and also the Dewar flask. His researches included studies of the physiological action of light and the liquefaction of gases with particular investigation of low temperatures. His investigations and discoveries were given recognition in Europe and also in the United States. In 1889 he won the first Hodgkins gold medal of the Smithsonian Institution and, in 1919, he was awarded the Franklin Medal of the Franklin Institute of Philadelphia.

INDUSTRIAL AND COMMERCIAL CONCERNS OF CINCINNATI.

The February issue of the "Cincinnatian," the monthly organ of the Cincinnati Chamber of Commerce, contains an interesting sketch of the history of The Wm. S. Merrell Company, with a portrait of the President, Mr. Chas. G. Merrell. This is the first of a series of articles to appear in the "Cincinnatian," describing the industrial and commercial concerns of the city.

THE GOLDEN JUBILEE IN THE SERVICE OF PHARMACY AND RESEARCH OF PROFESSOR DR. A. TSCHIRCH.

The Swiss Apothecaries' Society has issued an index-reference to publications of Professor Dr. Alexander Tschirch; thirty pages are required for listing the titles of subjects, and impress the service rendered by him—his monumental work is "Handbuch der Pharmacognosie," reviewed by Dr. Frederick B. Power in May 1920.[1] A sketch of Professor Tschirch, an honorary member of the association, appears in the April number, JOURNAL A. PH. A., p. 359, by Dr. Edward Kremers.

"NEWARK LEDGER" SHOWS AN INTEREST IN PHARMACEUTICAL EDUCATION.

In a recent Sunday edition of the *Newark Ledger*, several columns were devoted to the New Jersey College of Pharmacy, giving an historical account of its activities.

DEATH OF OLIVER FRANKLIN FULLER.

Oliver Franklin Fuller, Honorary President of the American Pharmaceutical Association, 1918–1919, died April 10, aged 93 years. A sketch of the deceased is printed in the October number, 1918, Journal A. Ph. A. He was chairman of the board of directors of the Fuller-Morrisson Company of Chicago, and until shortly before his death took an active part in the management of the concern which he founded in 1872. He was an active member of the Chicago Veteran Druggists' Association, and at the Chicago A. Ph. A. meeting participated heartily in the entertainment provided by this association and the local committees. He joined the American Pharmaceutical Association in 1869.

SOCIETIES AND COLLEGES.

READJUSTMENT OF THE A. PH. A. ACTIVITIES FOR BETTER AND GREATER SERVICE TO AMERICAN PHARMACY.

The officers of the House of Delegates A. Ph. A. have addressed the State Pharmaceutical Associations relative to the plan adopted at the Cleveland Meeting of the American Pharmaceutical Association for extending its usefulness through the rearrangement of its activities. The letter follows, and see also "The Need for a More Thorough Organization of American Pharmacy," following the Council Letter in this issue of THE JOURNAL, page 364, and the editorial on page 291—

To the State Associations:

The American Pharmaceutical Association, as the mother association of the other pharmaceutical organizations of our country, both state and national, has rendered a wonderful service to pharmacy, and probably its most effective service has been on inaugurating and encouraging the establishment of the state associations. It can render an even greater service in the future as the clearing house of the various organizations that have sprung from it, in solving the many problems of interest to all of them. To do this, however, it must be brought into more intimate contact with them, and through them with the rank and file of American pharmacists, and made more responsive to their needs. In recent years it has been realized that the A. Ph. A. was not attracting the interest and coöperation of these organizations, and especially the state associations, to the extent that it should. The state associations sent delegates to the annual meetings, but the plan of organization was such that these delegates could not exert the influence they deserved in the work of the Association.

At the Seventieth Annual Meeting held in Cleveland, Ohio, last August, a constructive plan was adopted for extending the usefulness of the A. Ph. A. through the rearrangement of it activities, so that the state association in particular and the divisional organizations, such as the N. A. R. D., N. W. D. A., A. D. M. A. and others, should have a most responsible

[1] JOURNAL A. PH. A., p. 553.

part in its direction and control. A comprehensive statement of this plan is presented in the enclosed reprints* from the JOURNAL OF THE A. PH. A. ("Readjustment of A. Ph. A. Activities for Better and Greater Service to American Pharmacy," by E. F. Kelly; JOURNAL of September 1922, pp. 664–66; "Constructive Efforts in Behalf of American Pharmacy," by Ambrose Hunsberger; JOURNAL, September 1922, pp. 666–667; "Reorganization Plan of the American Pharmaceutical Association," JOURNAL of September 1922, pp. 724–725).

As responsible officers of your Association, may we direct your attention to the following advantages to your association under this plan:

(1) That the House of Delegates, of which the State Association will provide the general majority of members, will initiate and determine the general policies and activities of the Association, subject to the approval by the General Session.

(2) That the House of Delegates either nominates or elects the general officers of the Association.

(3) That the House of Delegates will provide the opportunity so long needed for the representatives of the state associations to come together at least once a year to consider questions of mutual interest to them and to pharmacy in general.

(4) That in the House of Delegates the representatives of the state associations will also be brought into contact with representatives of the divisional organizations, providing the broadest possible exchange of views among all the pharmaceutical organizations.

At the same time it should be emphasized:

(1) That no financial contribution is expected from the state associations and no financial responsibility, but only the promise of such support as they may be able to give in building up the A. Ph. A. membership in their respective associations.

(2) No conflict with the work of other pharmaceutical organizations and no restrictions of their activities.

(3) The replacement by this comprehensive plan of others considered during the last few years, including the so-called "Hostmann plan" presented to the associations last year by the House of Delegates.

* Sent in the letter to which mention is made.—EDITOR.

It is provided that this plan becomes effective when it has been approved by twenty state associations of whose membership 10% are also members of the American Pharmaceutical Association. Therefore, those state associations that now meet this membership requirement, or that can bring their A. Ph. A. membership to the required 10%, are requested to approve at the earliest opportunity, either through action of their Executive Committee or at their annual meeting, so that the plan may be put into operation as soon as possible.

Those state associations which do not at present meet this membership requirement are nevertheless requested to approve the plan and to vote affiliation with the parent association—the American Pharmaceutical Association, to the end that pharmacy may be advanced and its interests conserved by better coöperation among pharmaceutical organizations, all of which are really striving for the same worthy cause.

(Signed) E. F. KELLY,
Chairman.
WM. B. DAY, *Secretary.*

DRUG TRADE BUREAU OF PUBLIC INFORMATION.

The following bulletins of the Drug Trade Bureau of Public Information have been issued:

Bulletin A—1.—"Why Pharmacists Oppose Sales of Drugs in General Stores."

Bulletin A—2.—"Retail Drug Trade Denies Burns' Charges of Dope Selling."

Bulletin A—3.—"American Drug Manufacturers to Hold Annual Meeting in New York City."

Bulletin A—4.—"Remington Honor Medal to Be Awarded to Dean Henry H. Rusby of Columbia University, School of Pharmacy."

Druggists should look for comment on these items in the newspapers. Through the medium of these bulletins the public will be made better acquainted with pharmaceutical service, how the people are protected by pharmacists who have the genuine association spirit and endeavor to live up to the ethics of their profession; how, on the other hand the unqualified do not serve and endanger life and health—those who engage in the drug business solely for mercenary or other unworthy motives do a great harm, and are a source of undesirables that bring disrepute on the great majority engaged in pharmacy.

Clippings of references to these bulletins, comments thereon or prints—wholly or in

part—in the newspapers should be mailed to Director Robert P. Fischelis, 509 High Street, Newark, N. J., and thereby give encouragement to the Bureau.

These bulletins serve another educational purpose—newswriters and editors are made acquainted with our viewpoint on things relating to pharmacy and the drug industries. The drug business has suffered in the estimation of the people because of unguarded and erroneous statements reported in the Press, relative to sales of narcotics; unquestionably in some instances the assertions have been made without comprehension of their indefiniteness and the far-reaching harmful effect of the misconstruction, leaving a sting and implanting resentment in the most conservative and forgiving.

The Proceedings of the American Pharmaceutical Association record that many years ago ways and means were outlined by pharmacists for regulating sales of narcotics, and their deep concern evidenced relative to the evils of habit-forming drugs.

NATIONAL ANTI-NARCOTIC CONFERENCE TO BE HELD IN WASHINGTON, MAY 3–4.

An announcement has been sent out by Rexford L. Holmes, as Executive Secretary, for a meeting of a National anti-narcotic conference, May 3–4, to be held at the New Willard Hotel in Washington, D. C. The meeting is to be attended by representatives of state boards of health, universities, religious and welfare organizations, associations, etc. to discuss plans looking toward the mitigation or total elimination of the illegitimate manufacture, distribution and use of narcotic drugs, and related subjects.

Among the signers to the call are the following:—

Hon. Hubert Work, M.D., Secretary of the Interior; Rev. Charles Wood, D.D., Pastor of the Church of the Covenant, Washington, D. C.; Surgeon-General M. W. Ireland, U. S. A.; Rear Admiral E. S. Stitt, U. S. N., Surgeon General of the Navy; George M. Kober, M.D., LL.D., Dean of the Medical School, and Professor of Hygiene and Dietetics of Georgetown University; Rev. William S. Abernethy, D.D., Pastor of the Calvary Baptist Church, Washington, D. C.; Hon. I. M. Foster, LL.D., Member of the House of Representatives, from Ohio; Mrs. Laura B. Evans, Trustee of the University of Illinois; Rev. Howard H. Russell, D.D., Founder of the Anti-Saloon League of America; Justice Stanton J. Peelle, LL.D., Formerly Chief Justice of the U. S. Court of Claims; Andrew Wilson, Ph.D., D.C.L., Lawyer; President of the Anti-Saloon League of the District of Columbia; Wayne B. Wheeler, LL.D., General Council and Legislative Superintendent, Anti-Saloon League of America; Percy S. Foster, President of the Mortgage and Trust Company, Washington, D. C., and Treasurer of the Conference; Owen P. Kellar, LL.B., Churchman, and President of the Christian Endeavor Alumni Association of the District of Columbia; Mrs. Ellis A. Yost, Legislative Representative of the National W. C. T. U.; Mrs. William A. Fitzgerald, President of the Federation of Women's Clubs of California and a Director of the Los Angeles Anti-Narcotic League.

The purpose of the following is only for giving information. A news paper item under date of April 9, reads:—

"Officials of the International Anti-Narcotic League which recently announced an alliance with the National Anti-Narcotic League and the Anti-Narcotic League charged that Rexford L. Holmes, a Washington church worker, was wrongly using the name International Anti-Narcotic Society to mislead those he had invited to attend an Anti-Narcotic meeting here in Washington May 3rd. Replying on a letterhead of the National Anti-Narcotic Conference Mr. Holmes said he had used the name International Anti-Narcotic Society, which is different from the International Anti-Narcotics Society, on the direct authorization of its officials in Spokane, Washington. Thereupon, the International Anti-Narcotic League announced it would have an Anti-Narcotic Conference of its own here (Washington) in August."

The titles of narcotic associations are somewhat confusing and may be the cause of the misunderstanding evidenced by the foregoing news item—1. International Anti-Narcotic League; 2. National Anti-Narcotic League; 3. Anti-Narcotic League; 4. International Anti-Narcotic Society; 5. International Anti-Narcotics Society; 6. National Antinarcotic Conference.

Our information is that much of the present propaganda is unnecessary. The Harrison Law is now being enforced 90 per cent. effectively, there is only a leak of about 10 per cent. into illegitimate channels of the narcotic drugs which are imported legitimately. The matter of controlling illegitimate shipments is an international problem. There is no immediate danger of an increase in addiction in this coun-

try. The necessity of a conference at present may be questioned, and also that it will, at this time serve a very great useful purpose.

AMERICAN DRUG MANUFACTURERS' ASSOCIATION ANNUAL MEETING.

The twelfth annual meeting of the American Drug Manufacturers' Association will be held at the Hotel Biltmore, New York, April 16 to 19, inclusive.

The scientific section will hold a morning and afternoon session Monday, April 16, and a morning session Tuesday, April 17. The meeting of the pharmaceutical section is scheduled for Monday at 2 P.M., while the crude drug section will meet the same afternoon at 4 o'clock. A meeting of the biological section will be held Tuesday at 10:30 A.M. The general sessions of the association as a whole will begin Tuesday afternoon at 2 o'clock.

The business sessions will be devoid of all purely formal features and will be devoted to practical discussion of important trade problems, the alcohol regulations, the narcotic situation, transportation difficulties, foreign trade and kindred problems. The association will be called upon for an expression on the proposed model narcotic act submitted by the National Drug Trade Conference to constituent members for action. The delegates from the American Pharmaceutical Association are Jeannot Hostmann, *chairman;* Clyde L. Eddy, and E. G. Eberle.

DRUG AND CHEMICAL SQUARE CLUB IS DONOR OF FLAG.

The U. S. Army Square Club was presented March 6, by the Drug and Chemical Square Club, composed of master masons of the trade and affiliated professions, with a beautiful white silk flag bearing the insignia of the former organization. The presentation was made at a meeting of the U. S. Army Square Club, Governor's Island, by Thomas R. Freebody, president of the donor club. Col. Julius A. Penn, president of the U. S. Army Square Club, accepted with a graceful speech.

The speaker of the evening was Dr. Joseph Fort Newton, thirty-third-degree Mason, who gave "square" clubs generally great encouragement. There are approximately 600,000 members of square clubs throughout the country, and this membership is affiliated with a National League of Masonic Clubs. The headquarters of the National League of Masonic Clubs, Inc., is at Wilmington, Del., the president for the current year being Melvin Allen, M.D., of Reading, Pa., and the secretary, E. A. MacKinnon, of Wilmington, Delaware.

STATE ASSOCIATION MEETINGS.

The dates of Kansas State Pharmaceutical Association Meeting have been changed to May 15–17, at Wichita—Broadview Hotel is headquarters.

The board of trustees of New Jersey Pharmaceutical Association has chosen June 12–15 as the time for the fifty-third annual meeting, at Hotel Monmouth, Spring Lake.

Oklahoma Pharmaceutical Association will convene in Oklahoma City, April 16–18. This convention will mark the end of the first year of their new unit organization, and much interest centers on the report of progress.

Virginia Beach has been selected for the place of meeting of Virginia Pharmaceutical Association, during the week of June 25.

OFFICERS MINNESOTA PHARMACEUTICAL ASSOCIATION.

Minnesota Pharmaceutical Association elected the following officers for the ensuing year: W. E. Burke, of St. Paul, president; C. C. Crosby, of Buhl, first vice president; G. J. DeMars, of Fertile, second vice president; Mrs. Marion Ludden, of Minneapolis, third vice president; Gustav Bachman, of Minneapolis, secretary, and H. Martin Johnson, of St. Paul, treasurer. H. C. Trowbridge, retiring president, was elected to the executive committee.

THE STERLING CHEMISTRY LABORATORY AT YALE DEDICATED DURING MEETING OF AMERICAN CHEMICAL SOCIETY.

The Sterling Chemistry Laboratory, the gift of the late John W. Sterling, of New York City, to Yale, was dedicated on April 4, in the presence of representatives from seven foreign universities and members in attendance at the meeting of the American Chemical Society at New Haven.

The teaching laboratories have a capacity of 900 students at one time. With three shifts 2700 students can be accommodated in the laboratory courses, and provisions have been made for that number. The laboratories provide facilities for teaching elementary, organic, analytical, industrial and physical chemistry.

COLLEGE OF PHARMACY NEWS ITEMS.

Connecticut pharmacists plan the establishment of a College of Pharmacy in New Haven.

Michigan faculty of the College of Literature, Science and Arts, decided against the adoption of correspondence courses.

Maryland pharmacists have decided that the Department of Pharmacy, University of Maryland shall not be slighted in the matter of distribution of funds by the State.

Hon. Lawrence Timmerman has introduced a bill in Wisconsin Legislature asking for an appropriation of $250,000 for the construction and equipment of a pharmacy building and a garden house for the pharmacy department of the University of Wisconsin.

A six-story annex to the New York College of Pharmacy building is in process of construction.

Brooklyn College of Pharmacy is promoting a fund for a new site and building.

New buildings are being considered for Albany College of Pharmacy.

An Honor Society is contemplated in the School of Pharmacy of the Medical College of Virginia—membership is limited to those having averaged 90 or more for one and a half sessions—Miss Myrtis Jennings and H. B. Haag are reported as eligible.

Kappa Epsilon, a national pharmaceutical sorority, requires that chapters be only established in colleges and schools of pharmacy holding membership in the American Conference of Pharmaceutical Faculties.

THE PHARMACIST AND THE LAW.

FORMER PROHIBITION DIRECTOR OF PENNSYLVANIA AND MANY OTHERS ACCUSED IN LIQUOR CONSPIRACY.

One of the defendants in a liquor conspiracy trial in progress at this writing, in Philadelphia, is William C. McConnell, former prohibition director of Pennsylvania; there are many other defendants, among them: Albert F. Slater, who was McConnell's secretary; Hiram W. Benner, head of the permit division in McConnell's office; Samuel B. Wolf, in charge of the Pittsburgh office under McConnell.

NARCOTIC SEIZURE IN WASHINGTON.

Narcotic drugs were found in possession of Edwards Trading Company, who had no government license. Representatives of the Edwards concern declared that every dollar's worth of the narcotics seized, said to include 320,000 tablets containing 10 per cent. of opium, was bought from the government out of army stocks and delivered to the company by government carriers. They state further that, while the company might be charged with technical violation of the law in not having a permit to possess or sell narcotics, it received no warning from the War Department when the latter sold it the narcotics, which the firm attributed to the department's alleged anxiety to sell.

According to a newspaper item, Surgeon-General M. W. Ireland stated that "there has not been an ounce of narcotics sold at the Washington medical supply depot since 1921, and then only a small order under government regulations—this order included about ten bottles of cocaine and 260 bottles of morphine." He states further that "records of the New York army supply depot, on file in Washington indicate that no narcotics have been sold from there."

T. D. 3449 PROTESTED BY THE DRUG INDUSTRIES.

Strong verbal protest against T. D. 3449 requiring permits for even very small quantities of alcohol to be confirmed was made March 19 by representatives of the drug trades at a hearing before Judge Britt, chief counsel of the prohibition unit. W. L. Crounse, in Washington, representative of the N. W. D. A., made the principal statement. A. Homer Smith, secretary of the American Drug Manufacturers' Association, and E. C. Brokmeyer, counsel of the N. A. R. D., pointed out the hardships to the retail trade that would follow from the decision.

SUPPLIES OF INDUSTRIAL ALCOHOL.

Commissioner Blair has approved the selection of a committee of technical men to cooperate with the Prohibition Unit in supervising the production and distribution of supplies of industrial alcohol.

LABELING FLAVORING PRODUCTS.

The term "extract" implies an alcoholic product. Flavoring products prepared with vehicles other than alcohol should therefore not be labeled with the term "extract." The Federal food and drugs act does not require a statement of the proportion of alcohol on the labels of flavoring extracts used exclusively for food purposes, although certain State laws make this requirement. Extracts sold or used for any medicinal purposes should have the proportion of alcohol plainly stated on the label.

Non-alcoholic flavoring products may be labeled with the term "flavor," provided they contain the same kinds and proportions of flavoring ingredients as are required by the department's definitions and standards for extracts, and provided further they are labeled with some term in direct connection with their names to show that the vehicle is not alcohol.

RETAIL PRICE-FIXING.

Hon. Clyde Kelly is convinced that "before the next session of Congress has proceeded very far the principle of price standardization will be written into the law."

MENNEN SALES POLICY UPHELD BY U. S. CIRCUIT COURT OF APPEALS.

A unanimous decision has been rendered by the U. S. Circuit Court of Appeals, Second Circuit, reversing an order recently issued against Mennen Company by the Federal Trade Commission.

The Court's decision defines a wholesaler in the following languages:

"Whether a buyer is a wholesaler or not does not depend upon the quantity he buys. It is not the character of his buying but the character of his selling which marks him as a wholesaler as this Court pointed out in *The Great Atlantic & Pacific Tea Company vs. Cream of Wheat Company, supra.* A wholesaler does not sell to the ultimate consumer but to a "jobber" or to a "retailer." The persons who constitute these mutual or co-operative concerns are buying for themselves to sell to the ultimate consumers, and not to other "jobbers" or to "retailers." The nature of the transaction herein involved is not altered by the fact that they make their purchases through the agency of their corporation. For some purposes the corporation is distinct from the members who compose it but that distinction is a fiction of the law and the Courts disregard the fiction whenever the fiction is urged to an intent and purpose which is not within its reason and policy. And in such a case as this the fiction cannot be invoked. The important fact is that the members of the corporation are all retailers who buy for themselves to sell to the ultimate consumer. The Mennen Company is within its rights in classifying them as retailers.

"The facts established by the testimony are not sufficient to constitute a violation either of the Federal Trade Commission Act or of the Clayton Act and they do not support the Commission's conclusions of law. The Mennen Company is not shown to have practiced unfair methods of competition in commerce."

A news item states that the Federal Trade Commission will carry the case to the United States Supreme Court.

STATE LEGISLATION.

In a bulletin recently issued by the American Manufacturers of Toilet Articles, through the business manager, Frank K. Woodworth, attention is called to State bills which are menacing the industry, particularly with reference to Kansas, and Pennsylvania. Kansas and Pennsylvania propose a tax on all perfumes, cosmetics, and proprietary medicines, and a definition of the term "cosmetics" in the Kansas act, has a wide range which covers practically any toilet article. The proposed tax in Kansas would be, should the act pass, ten per cent. of the retail price, whether the manufacturer was in the State or without, and would provide for the registering by the State of dealers and the collection of the taxes.

The Pennsylvania bill, while not nearly so drastic as the Kansas act, would tax toilet articles at the rate of one cent for each twenty-five cents sale or fraction thereof. The passage of this bill, Mr. Woodworth holds, would put more onerous duties upon the industry, as all dealers would be obliged to report quarterly to the auditor-general the amount of tax on each article handled by him, which includes cigars, cigarettes, candies, cameras, films, pipes, jewelry, sporting goods, and chewing gum, all taxed at different rates. He is also subject to have his books examined pertaining to the business made taxable by the act.

The West Virginia act, according to Mr. Woodworth, is more drastic than the National Pure Food and Drug Law, and provides for defining adulteration and mis-branding, and defining the term "drug" and "food" more broadly than even the National Act does. "It would mean," says Mr. Woodworth, "that we should not only have to comply nationally but again in the State of West Virginia."

BOOK NOTICES AND REVIEWS.

Cuz, Iams, Poems and Papers. By W. H. Cousins, editor of the Southern Pharmaceutical Journal, Dallas, Texas. Arthur S. Mathis, Limited Edition. Pp. 191.

Cow puncher, pill roller, pharmacist, poet, philosopher, and pharmaceutical journalist! All these rolled into one is Walter Henry Cousins of Dallas, in the State of Texas, and the volume of his selected essays and rhymes which is published under the name "Cuz" is a unique exhibit of his winning personality.

The world loves a real man and hates a sham, and the man who has the temerity to write his full heart for the world to read is sure to find interested readers. Walter Cousins is above all genuine. He has a fine command of language from cowboy slang to polished poetry, and through it all runs the thread of originality, of humor and of love for pharmacy and his fellow pharmacists who will read "Cuz" with pleasure. C. A. M.

Applied Pharmacology. By A. J. Clarke, Professor of Pharmacy in University of London. P. Blakiston's Sons & Company, 1923. 390 pages.

In the preface of this interesting book the author says "unfortunately there are at present many reasons why medical students and others often fail to appreciate the connection between the science of pharmacology and the art of therapeutics, one of the chief reasons being that the student is taught pharmacology and therapeutics at different stages of his career and this creates a gap. * * * The principal aim of this book is to try and bridge this gap between pharmacology and therapeutics, to demonstrate as clearly as possible the connection between the two subjects." While there is much that is commendable in the work we do not think that the book has met the announced purpose of bridging the gap between pharmacology and therapeutics. The mechanism of the action of drugs is set forth in an interesting and convincing style but the clinical applications of these facts are not sufficiently detailed to serve as a guide for the student to practical therapeutics.

The book is remarkable for the absence of antiquated, traditional pharmacology and for the clear exposition of some of the more recent experimental results and theories of drug actions. One evidence of the ultra-modernism of the author is the extraordinary number of new drugs to which reference is made and the brevity, and sometimes complete absence, of consideration of old and still-trusted *arma medicamentarium*. For instance, considerable space is given to the recent antiseptic dyes, such as brilliant green, arciflavine, etc.; optochin has 4 references in the index, histamin is considered in 5 places, halogen derivatives of naphthol are described in some detail, although betanaphthol is only incidentally referred to; eucupin has 4 references in the index, eusol 2, and histamin 5. On the other hand aconite, belladonna, asafoetida, bismuth salts, alum, scopolamin, cacodylates, iron, menthol, iodoform, homatropin and a host of other frequently employed drugs are not indexed at all. In this connection, however, it should be stated that the indexing is unsatisfactorily done and several of the drugs whose absence from the index strikes the attention are at least passingly mentioned in the text. Other features unusual in books on pharmacology, which also evidence the interest of the author in present-day problems, is a chapter of 25 pages on the vitamines, one of 11 pages of radium on X-ray, one of 6 pages on the products of protein decomposition and 13 pages devoted to immunity reactions. Considering the relatively small size of the book this seems an unduly large amount of space to be given to a class of subjects which are doubtfully classified as pharmacological.

Although there is so much omitted that the book can scarcely be recommended as a general textbook, as an exegesis of the modern trend of pharmacological investigation it offers much food for thought to those who are curious about the how and the why of drug actions.

H. C. W.

The Microscopical Examination of Foods and Drugs. By Henry G. Greenish. 3rd ed., Philadelphia, P. Blakiston's Son & Co., 1923.

The book purports to be a practical introduction to the methods adopted for the microscopical examination of foods and drugs, in the entire, crushed and powdered state. It is primarily intended for students.

The present (3d) edition is largely a reprint of the second edition, which appeared in 1910. As stated in the preface, the original arrangement of the subject matter has been retained, as it had proven well adapted for its particular purpose.

The contents are discussed in fifteen sections, the first being the starches, the study of which is comparatively simple. In other sections are discussed, (II) hairs and textile fibres (III)

spores and glands, (IV) ergot, (V) woods, (VI) stems, (VII) leaves, (VIII) flowers, (IX) barks, (X) seeds, (XI) fruits, (XII) rhizomes, (XIII) roots, (XIV) adulterants of powdered foods and drugs, (XV) general scheme for the examination of powders.

The author thus has the student proceed from the simple to the complex. Careful consideration has evidently been given to the selection of the substances to be examined, so that the student would become familiar with varying methods and varying structural characteristics useful in the examination of drugs and foods. Instead of discussing in detail the characteristics of many products, the author limits the discussion to structural types of drugs, spices, foods and several technical products. Throughout the text, and in the appendices A and B, following Section XV, reagents are given and statements are made which are helpful in the microscopical examination of various products.

The numerous illustrations throughout the text are helpful guides and make the book doubly valuable.

It is hoped that economical conditions at the time of issuing a fourth edition will have improved, in order to permit of elaboration.

In the way of suggestion for this fourth edition, the reviewer should like to see included a larger number of references to standard works, such as that of Reichert on starches, Dekker on tannins, Tunmann and Molisch on plant microchemistry. It also appears desirable to give reference to the latest, rather than the earlier editions of such works as Wiesner on plant products (3d ed. 1914–1921), Wm. Herzberg on paper testing (4th ed. 1915), etc. Some of the work of Tunmann, Mayrhofer, Rosenthaler, Nestler, and others, on microsublimation of drugs and foods, might also be included with advantage.

Recent work on the nature of crystals in pepper proves the presence of magnesium oxalate and not calcium oxalate, as stated. The author discusses saffron and its adulteration with Calendula flowers. We have not observed this adulterant within recent years, but find saffron frequently weighted with various salts and glycerin, or even entirely substituted by other flowers which are artificially dyed and weighted. Examples of recent adulterations, such as the one mentioned above, might well be included, as this would forcibly call attention to the significance of microscopical examination.

The book covers a large field, and covers it well. It deserves consideration by American students. A. V.

Practical Physiological Chemistry. By Philip B. Hawk, M.S., Ph.D. 8th Edition. 666 pages and index. P. Blakiston's Son & Co., Philadelphia. Price $5.00.

The popularity of Dr. Hawk's Chemistry is indicated by the fact that since its initial appearance in 1907, it has passed through eight editions. The present volume has increased somewhat in size over its predecessors, rendered necessary by the inclusion of important new material.

The arrangement of this edition is essentially the same as in the former ones: A discussion of enzymes and of carbohydrates being followed by a consideration of salivary digestion. The composition and chemical peculiarities of the proteins leads up to a consideration of gastric digestion and a quite complete review of the clinical methods for gastric analysis. As preliminary to studying pancreatic digestion, the chemistry of the fats is taken up; then follows a discussion of intestinal digestion; the production and composition of bile; putrefactive processes and the composition of the feces. As would be expected, the chapters on the blood and blood analysis are quite comprehensive; and this applies likewise to the succeeding chapter on "Respiration and Acidosis." A chapter on milk then follows; the chemistry of the epithelial, muscular, and nervous tissues is taken up; and then a very full discussion of urine, with a consideration of its composition and a number of clinical tests. In the next chapter, under the term "Metabolism," the reader is introduced to those fascinating discoveries that have been made in comparatively recent times regarding the importance of certain dietetic factors formerly considered of little moment.

The universal approval with which the preceding editions of "Practical Physiological Chemistry" have been greeted is sufficient evidence of their high worth; as regards the present edition, it can be added that it really constitutes a revision. Dr. Hawk has quite admirably combined clear, succinct, theoretical discussion with practical methods; methods which serve not only to illustrate points which he desires to bring out, but also those which are of value from the standpoint of clinical application. If any adverse criticism could be advanced, it might be against the detailed presentation of certain methods which are

generally considered somewhat inferior to more recent ones which are barely mentioned; though even here, the foot note references enable the reader to consult the original papers bearing on these more recent methods.

The make-up of the book is excellent. The paper is good; printing clear; typographical errors apparently absent; and the illustrations leave nothing to be desired.

C. C. HASKELL.

The well known firm of Ferdinand Enke in Stuttgart, publishers of pharmaceutical, chemical and technical works, favored us with the following books for reviews:

Das Apothekenwesen. Seine Entstehung und Geschichtliche Entwickelung bis zum XX. Jahrhundert. Von Prof. Dr. J. Berendes. Lex. Octavo, 366 pp. $2.40.

Julius Berendes from Goslar (see The Journal, 1922, p. 757) is one of the celebrated trio of German pharmaceutical historians, the others being Hermann Peters and Hermann Schelenz. Owing to his scientific achievements the German government in 1902 bestowed upon him the title "Professor" without a professorship, a unique example and distinction in the realm of pharmacy.

The work is principally intended to show the historical development of pharmacy (Apothekenwesen) in Germany and other countries are not considered. However, at the beginning the history of pharmacy from antiquity up to the middle ages is also discussed. The following abstract from the table of contents shows the scope of the work.

1. Egyptians, Phoenicians, Babylonians, Israelites, Persians, Indians, Chinese and Japanese.

2. Greeks: Origin of Therapeutics, Natural Philosophy, Rhizotomes, Pharmakopoles and Physicians, Hippocrates, Alexandrians, Separation of Pharmacy from Medicine.

3. Romans: Famous Encyclopedists, Merchandising, Rome, Christianity.

4. Middle Ages: Arabians, Apothecary Shops.

5. Germans: History, Medicine of the Monks.

6. Ninth and Tenth Century: Universities, Edict of Emperor Frederic II.

7. Thirteenth Century: Privilegiums, First German Apothecary Shops, Monastery Pharmacies, Court Pharmacies.

8. Fourteenth Century: Alchemy, Pharmacopœias.

9. Fifteenth Century: Dispensatories, Regulations, Appentecker zu Ulm Gesetz und Ayd.

10. Sixteenth Century: Natural Sciences, Botany, Medizinaltaxe, Apotheker, Pests.

11. Seventeenth Century: Natural Sciences, Botany.

12. Eighteenth Century: Natural Sciences, Botany.

13. Nineteenth Century: Natural Sciences, Celebrated Apothecaries, Chemists, Botanists and Pharmacognosists, Associations, Pharmacopœias, Pharmaceutical Education, Traffic in Medicines and Poisons, Nostrums, Druggists.

14. Military Pharmacy from Ancient to Present Times.

Berendes gives a bibliography of history of pharmacy comprising five pages, an excellent addition to the work. The author's index fills five pages of three columns each and the subject index eleven pages of two columns each. Why Berendes, the same as many others, corrupts Antoine Baumé, the inventor of the hydrometer scale named after him, into Beaumé the referee cannot understand, especially as attention has been called to this common error on numerous occasions.

The book is a masterwork which in a concise manner treats the history of pharmacy. Through the study of this subject the student will be inspired with more love for his chosen profession and even the mature pharmacist will become acquainted with the ups and downs of his calling.

Surely Berendes Apothekenwesen should become better known on this side of the Atlantic.

Kurzes Lehrbuch der Anorganischen Chemie. Von. Dr. A. Stavenhagen, Prof. und Leiter der Chem. Laboratoriums der Bergabteilung des Techn. Hochschule in Berlin, Geheimer Bergrat. 2. Auflage mit 170 Holzschnitten. Lex. Octavo, 543 pp. $2.40.

As the title indicates the subject of inorganic chemistry is treated in a concise manner, in 543 pages. The author has solved this problem in an excellent way. He has also added something new in a book of this kind, namely the physiological action. The one of sodium sulphate on p. 312 is new but plausible and should be studied, especially by physiological chemists. We can highly recommend this book to pharmacists and pharmaceutical students.

OTTO RAUBENHEIMER, PH.M.

PUBLICATIONS RECEIVED.

Published Papers of Botanical and Pharmaceutical Interest of the Mulford Biological Exploration of the Amazon Basin:

1. "Oil of Bystropogon canus," by Julia Whelan, JOUR. A. PH. A., May 1922, Vol. XI, No. 5, P 337.

2. "Brazil Nuts," by O. E. White, *Brooklyn Botanic Garden Leaflets*, Ser. X, No. 4, May 1922.

3. "Curatella Americana," by Fanchon Hart, *Druggists' Circular*, August 1922, 296.

4. "Botanical Exploration in Bolivia," by O. E. White, *Brooklyn Botanic Garden Record*, Vol. XI, No. 3, 931.

5. "Report of work of the Mulford Biological Exploration of 1921–22," by H. H. Rusby, *Jour. N. Y. Botanical Garden*, Vol. 23, No. 272, 101, August 1922.

6. "New Species of Trees of Medical Interest from Bolivia," by H. H. Rusby, *Bul. Torrey Botanical Club*, Vol. XLIX, 259, September 1922. (Also in *National Druggist*, November 1922, 458.)

7. "Some Interesting Medicinal Plants of Bolivia," by H. H. Rusby, JOUR. A. PH. A., Vol. XI, No. 10, 775, October 1922.

8. "Histology of Cocillana and Substitute Barks," by C. W. Ballard, JOUR. A. PH. A., Vol. XI, No. 10, 781, October 1922.

9. "The Histology of Vilca Bark," by F. Hart, JOUR. A. PH. A., Vol. XI, No. 11, 906, November 1922.

10. "Composition of Nectandra Coto, Rusby" by H. A. Seil, JOUR. A. PH. A., Vol. XI, No. 11, 904, November 1922.

NEW PUBLICATIONS.

Van Nostrand's Chemical Annual, a Hand Book of Useful Data for Analytical, Manufacturing, and Investigating Chemists, Chemical Engineers, and Students, Edited by John C. Olsen, Am., Ph.D., Assisted by T. R. Le Compte, B.A., M.S., Fifth Issue, Thoroughly Revised and Enlarged. Limp Cloth, 5 by $7^1/_4$ inches; pages xxii + 900. New York: D. Van Nostrand Company, 1922.

Veterinarian's Handbook of materia medica and therapeutics. By D. H. Udall, B.S.A., D.V.M., professor of veterinary medicine and hygiene, New York State Veterinary College at Cornell University, Ithaca, N. Y. $6^3/_4$ by $4^1/_2$ inches 178 pages, cloth. New York. The Macmillan Company.

Analytical Chemistry: Trattato di Chimica Analitica Applicata. Vol. II. By G. V. Villavechia. 2nd edition, revised and enlarged. 884 pp. Price, paper, 58 lire. U. Hoepli Milan.

Chemical Analysis: Standard Methods of Chemical Analysis. Vols. 1 and II. By Wilfred W. Scott. 714 and 680 pp. Price, $10.00. D. Van Nostrand Co., New York.

Chemistry: The Science of Matter and Its Changes. Hippolyte Gruener. 384 pp. Illustrated. Price $3.00. Harper & Bros., New York.

Chemistry: Second Year College Chemistry. A Manual of Laboratory Exercises. By William H. Chapin. 122 pp. Illustrated. Price, $1.50. John Wiley & Sons, Inc., New York.

Agricultural Bacteriology. By Joseph E. Greaves. Illustrated. Price, 21s. net. Constable & Co., Ltd., London.

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